**CRITICISMS OF THE BIOPSYCHOSOCIAL MODEL IN SPINE CARE: CREATING
AND THEN ATTACKING A STRAW PERSON**

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Running head: Criticisms of the Biopsychosocial Model

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Mini Abstract

A previous article in *Spine*¹ provided an erroneous and illogical critique of the biopsychosocial model. Evidence is used to refute concerns raised. We describe an evolving literature demonstrating the heuristic value of the model in developing effective assessment and treatment methods, and guiding research identifying etiological factors and prevention strategies.

ABSTRACT

Study Design. Spine Update on some major misconceptions of the biopsychosocial model.

Objective. To refute some of the erroneous beliefs about the weaknesses of the application of the biopsychosocial model to spine care.

Summary and Background Data. Currently, the biopsychosocial model of illness is the most heuristic perspective in understanding the etiology, assessment, treatment, and prevention of pain-related disorders such as spinal pain and disability. Only the misuse of the biopsychosocial model by inappropriately trained health-care specialists decreases its maximum utility and validity.

Methods. This is a point-by-point response to a previous article in *Spine* which inaccurately discussed some assumed limitations of the biopsychosocial model as related to spine care. It is also a more comprehensive review of the model and related clinical applications. Articles from the scientific literature are cited in refuting those assumed limitations.

Results. The previous article in *Spine* provided a superficial, and often erroneous, review of the biopsychosocial model of illness. In providing a point-by-point refutation of that review, a number of important clarifications were delineated. For example, concerns raised about the sole reliance of self-report outcomes are shown to be unfounded. By definition, the “bio” “psycho” “social” underscores the important interactive contribution of factors in each of these defining domains, and requires their individual assessments. It was also erroneously stated that there was an inherent “disconnect” between physical pathology and self-report in this model. However, the richness of the biopsychosocial model is the recognition of the need to continue to understand the pathoanatomic and pathophysiological explanations of spinal disorders (the *bio* part of the equation), as well as the psychosocial factors that may also be important (the *psychosocial* part

of biopsychosocial). Other questions raised about the scientific status of the model, the effectiveness of treatments based on the model, and so forth. were also addressed.

Conclusion. In agreement with the earlier *Spine Update*, the “...biopsychosocial model has been readily adapted to all aspects of spine care with many positive implications.” However, the author then raised some apparently major concerns. These concerns were shown to be unfounded. In point-of-fact, there is an ever-growing scientific literature demonstrating the heuristic value of this model in developing more effective assessment and treatment methods for spinal disorders, as well as guiding greater “cutting-edge” research on their etiologies and potential prevention techniques.

KEY WORDS: biopsychosocial; spine care; interdisciplinary; functional restoration

In a recent article in *Spine*, Weiner¹ provided a rather superficial, and we will argue erroneous, review of the rise of the biopsychosocial model of illness. In focusing on the heuristic value of the biopsychosocial model as it applies to spine care, Weiner goes on to extol its many virtues, strengths, and positive impact. However, he then goes on to suggest several concerns, and enumerates what he perceives as weaknesses of the model. The purpose of the present article is to delineate some of the flaws in Weiner's analysis. We will address them in the order presented in Weiner's treatise.

1. Concerns about Reliance on Self-Report of Outcomes

There is nothing inherent in the biopsychosocial model that limits outcome assessment to self-report. Some investigators may choose to limit the outcomes depending on the purpose of their study, but this is not an indictment of the model. By definition, the “bio” “psycho” “social” underscores the important contribution of factors in each of the three defining domains. Descriptions of the biopsychosocial model detail the importance of these three constituent domains or categories. Contrary to what Weiner asserts, the use of the biopsychosocial model does not limit outcome assessments to only self-reported psychosocial measures. Nothing could be farther from the truth! In fact, a substantial number of authors have emphasized repeatedly that there are three broad categories of measures—physical, psychosocial (including interpretations, affective state, behavior, and coping resources), and socioeconomic (including workplace factors, contextual demands, availability of wage replacement)—that should all be utilized to assess patients, in treatment planning, and as outcomes of clinical trials of spinal disorder patients (e.g.,²⁻⁵). Contrary to Weiner's assertion, reliance on self-reported outcomes is not an indictment of the model, but rather a criticism that might be targeted toward some who only give “lip service” to the model but fail to adhere to the rationale of the fundamental basis

underlying the model. This basis emphasizes the importance of going beyond the Cartesian dichotomy of *either* physical *or* psychological, and integrating biological, psychological, and social factors as they interact in pain and subsequent disability.

The three major categories (or biopsychosocial referents) comprising the biopsychosocial model, however, may not always display high concordance with one another when measuring a construct such as spinal pain or disability. As Flores and colleagues² have earlier noted in discussing the objectification of the measures of spine care outcomes:

“...such less-than-perfect concordance among these behavioral referents of a construct...is not unique to the area of spinal disorders or rehabilitation medicine in general. It has long been noted ..., that self-report, overt behavior and physiological indices of behavior sometimes show low correlations among one another. Therefore, if one uses a self-report measure as a primary index of a construct and compares it to the overt behavioral or physiological index for the same construct, direct overlap cannot automatically be expected. In addition, two different self-report indices or physiological indices of the same construct may not be as highly correlated as one would desire. What has plagued the evaluation arena in general has been the lack of agreement in the wide variation of measures used to document a construct such as pain and disability, as well as changes in that construct. Therefore, the literature is replete with many different measurement techniques and tests of a construct such as function. However, the literature is beginning to demonstrate which measures...appear to be most reliable and valid.”
(page 1623).

With the above quotation in mind, it is incumbent upon clinicians and investigators in the area of spine care to isolate what measurement or array of measurements are best used in

defining a construct, as well as documenting any changes in such a construct. There are a number of “assumption traps” that health care professionals need to avoid when considering what is the best outcome measurement to utilize. These traps are delineated below:

- One cannot assume, on an *a priori* basis, that one outcome measure will necessarily be more valid or reliable than another.⁶ It may be assumed that the more objective the measure, the more valid it will be; however, some outcomes are not easily assessed by objective measures. For example, pain, emotional distress, quality of sleep are primarily subjective. Even the putative behavioral expression of pain, so called pain behaviors, have to be validated against some “gold standard,” and the gold standard is self-report⁷. Even functional measures that rely on sophisticated performance-based equipment are dependent, at least to some extent, on patients’ willingness to perform at a maximal or optimal level. Since their behavior is voluntary, it may not be a perfect proxy for performance capability. Functional performance will be influenced by motivation, fear, understanding of instructions, as well as physical capacity.
- No matter what the level of accuracy or sophistication of the mechanical device used in collecting physiologic measures, it is always the case that human inference must ultimately be used in the interpretation of the findings. Moreover, although physical examination might be viewed as more objective and more valid than patient self-reports, the inter-rater reliability of physical examination of such activities as range-of-motion is less than optimal^{8,9}.
- There is usually no easy answer to the question: “What is the best set of outcomes to use with a spinal pain patient?” because the question itself needs to be prefaced by a number of more specific inquiries such as: for what purpose is the assessment being performed (e.g., patient management; treatment planning; work capacity evaluation; surgical pre-screening purposes; evaluation of outcome in a clinical trial of an analgesic drug, surgery, or physical therapy)? How

will results on different outcomes be integrated? What if the outcomes on different measures are inconsistent?

We agree that “outcomes assessment is not a done deal”^{1, p. 221}. Indeed, in any area of medicine or science, there is an ever-changing “landscape” in the quality of the reliability (internal consistency; stability over time), validity (content; concurrent; predictive; sensitivity to change), as well as the fidelity of measurement techniques, and their interpretability. Nevertheless, there is no doubt that psychosocial factors have consistently been found to be *more* predictive than physical ones in accounting for chronic low back pain (e.g.,¹⁰⁻¹³). Although such factors do not account for all the variance, they account for substantially more of the variance than physical variables. This is not to say that a health care provider should ignore such important physical variables, but should include them in a more comprehensive biopsychosocial perspective. The data supporting the predictive power of psychosocial variables support and thus validate the biopsychosocial model, not countermand it (e.g.,¹⁴⁻¹⁷). The answer to which array of variables “carry equal, if not primary weight” will vary from patient to patient, as well as across diagnostic entities, and possibly across time.

2. The Disconnection between Physical Pathology and Self-report

Weiner¹ cautions us that “the history of medicine, however, is filled with tales of diseases with insufficiently understood etiologic pathology and poor outcomes of treatment being inappropriately correlated (in its worst forms, etiologically/causally) with psychosocial phenomena” (page 221). He goes on to suggest that history tells us that embracing a biopsychosocial orientation will actually hamper the development of a better understanding of the etiology of many diseases. The examples he provides are spurious. For instance, he asserts that the Type A behavior pattern has impeded our understanding and treatment of coronary artery

disease. However, quite to the contrary, the identification of the Type A behavior pattern and its relationship to stress opened up whole new pathways of investigation that unequivocally demonstrated that the psychosocial construct of “stress” was a major risk factor for certain forms of coronary heart disease (e.g.,¹⁸), albeit not necessarily all forms. There are now even textbooks that focus on such important psychosocial factors in the field of cardiology (e.g., *Contributions Toward Evidence-Based Psychocardiology*¹⁹). There are also new journals that focus on biopsychosocial factors and medicine (e.g., *BioPsychoSocial Medicine*; <http://www.bpsmedicine.com/content>).

There has also been a number of other areas in medicine where this biopsychosocial approach has demonstrated the importance of considering psychosocial and lifestyle factors in common illnesses such as diabetes mellitus, hypertension, asthma, and certain types of gastrointestinal disorders, just to name a few (e.g.,²⁰). Weiner seems to want to return to the dated and discredited somatogenic-psychogenic dichotomy. This is exactly what the biopsychosocial model was created to replace. All people have different genetic compositions, prior learning histories, physical experiences, and they live in a social context. This way of thinking helps us to understand the diversity of responses to what might appear to be objectively the same pathophysiology. The biopsychosocial orientation had its initial roots in the work of Engel²¹, who cogently pointed out some of the severe limitations of the traditional biomedical theories of disease and causation, and posed the biopsychosocial model as a needed extension. It is not that the medical model is wrong, but rather it is incomplete. We do not have to make an “either-or” decision. The richness and heuristic value of the biopsychosocial model is the recognition that we need to continue to understand the pathoanatomic and pathophysiological explanations of low back pain (the *bio* part of the equation), as well as the psychosocial factors

that may be important in low back pain (the *psychosocial* part of biopsychosocial). Indeed, as a recent comprehensive review of the great advances in basic neuroscience processes of pain, as well as the development of new technologies such as brain imaging, new insights into the etiology of pain conditions such as low back pain is advancing significantly (e.g.,²²).

Finally, because there are currently no permanent “cures” (and none imminently on the horizon) for the majority of spinal problems²³, as well as many other chronic diseases (e.g., hypertension, diabetes, asthma, post-stroke syndrome, chronic obstructive pulmonary disease), one needs to move away from an exclusively *curative* approach to a more comprehensive *rehabilitative-management* approach to dealing with these chronic medical illnesses. Thus, for example, the treatment of hypertension involves not only the administration of medication, but also lifestyle issues such as diet, exercise, smoking cessation, and so forth, all of which can be affected by psychosocial factors such as compliance, culture, socioeconomic status, coping, among others. The same can be said for spinal disorders where individual differences in psychosocial factors can significantly affect the efficacy of traditional treatments such as spine surgery²⁴, and can contribute to the success of rehabilitation.

3. The Scientific Status of the Biopsychosocial Model

Weiner states that “a key ingredient to scientific theories is that they are testable/falsifiable” (page 221), and that a biomedical model was effective in hypothesizing that certain somatic pathophysiological events may be responsible for low back pain, and could be objectively tested. However, as noted earlier, we contend that, even though this is possible, the biomedical model has failed to this day to account for the majority of the variance required to fully understand the etiology, progression, and the effective treatment of low back pain. As we noted previously, substantial amounts of variance in the evolution and maintenance of disability

following back injury are predicted by psychosocial factors, proportionately more variance than can be accounted for by physical variables. These data illustrate that the biopsychosocial model is, indeed, a testable and, yes, falsifiable model. Failure of psychosocial factors to predict, or predict only a small proportion of the variance, might lead to the conclusion that the model was inadequate and thereby challenge the biopsychosocial model. There is a legitimate concern that failure of psychosocial factors to predict might lead to a conclusion that the wrong factors had been studied calling for more research into the potentially infinite number of psychological and social variables that might be important. However, the demonstration that specific psychosocial factors do predict significant amounts of variance makes this concern moot.

Furthermore, the biopsychosocial model has led to the development of a very effective interdisciplinary approach to the treatment of chronic low back pain. Unlike previous biomedically based approaches that emphasized monotherapies, such as surgery, pharmacotherapy, invasive procedures, and so forth alone, none of which have been proven unequivocally to be effective for all patients; the interdisciplinary approach has been repeatedly documented to be the most clinically effective and cost-effective approach for chronic noncancer pain such as chronic low back pain (cf.,²⁵⁻²⁸). Failure of such treatments would lead to disconfirmation of the model on which they were predicated, namely, the biopsychosocial model. Once again, the ability of such outcome studies to demonstrate, confirm, or falsify the biopsychosocial model argues against Weiner's criticism that the model is not falsifiable.

4. The Biopsychosocial Model Is Based on the Premise that Illness Is a Complex Synthesis of Biological, Cognitive, Psychological, and Social Factors

Contrary to Weiner's¹ statement that "Philosophers have fretted for millennia over mind/body interaction and implementing models based on debatable premises must itself be

subjected to debate” argument (p. 222), the status of the biopsychosocial model has progressed passed the overly simplistic mind/body dichotomy that was the major underpinning of the reductionist biomedical approach. The fact that a biopsychosocial model requires a better understanding of the complex interaction of a number of factors does not make it untenable. To the contrary, the fact that a complex goal is difficult to achieve should not prompt us to abandon the pursuit of that goal for the seduction of a more immediate, albeit “quick fix,” One that is only minimally effective. We are still at the infancy stage in developing complex solutions for complex problems.

5. The Outcomes of Treatments for Persistent Spinal Pain Based on the Biopsychosocial Model Are Just Now Being Studied, and there Is Conflicting Evidence to Date of Their Effectiveness in Decreasing Pain and Improving Function

Is there any treatment for back pain for which this statement would not be true?²³ As noted above, the review of the pain literature has unequivocally demonstrated the therapeutic effectiveness of the interdisciplinary approach to chronic pain (e.g.,^{25,28}). In fact, there is an extensive literature demonstrating the therapeutic effectiveness of a biopsychosocial model-based functional restoration program for chronic low back pain. The results of such programs (e.g.,²⁹⁻³¹) have demonstrated significant positive socioeconomic outcomes (such as return-to-work, decreased surgical rates, resolution of outstanding legal and medical issues) in chronically disabled patients with spinal disorders in both one-year as well as two-year follow-up studies. These results have been independently replicated by Hazard et al. and Patrick et al. in the United States, as well as in RCTs conducted by Bendix et al. in Denmark, Hildebrandt et al. in Germany, Corey et al. in Canada, Jousset et al. in France, and Shirado et al. in Japan³²⁻³⁸. The observation that different clinical treatment teams, functioning in different states and different

countries, with markedly different economic and social conditions and workers' compensation systems, produce comparable positive outcome results speaks highly for the robustness of the research findings and utility, as well as the fidelity, of this approach to pain management in occupational settings for patients with low back pain. Moreover, comprehensive reviews of the effectiveness of interdisciplinary pain management programs in general have further documented the clinical utility of the biopsychosocial model.^{26,39} Weiner¹ seems to have totally disregarded the outcomes of such clinical trials. In fact, Rainville, Kim and Katz⁴⁰ have recently noted that, during the past 20 years since Mayer and Gatchel first introduced the functional restoration model: "...This treatment model has received considerable study worldwide, and it is generally agreed that it is superior to standard care for reducing work absence in patients with chronic low back pain. Additionally, the concepts underlying functional restoration have been found to be highly relevant to patients with chronic low back pain, medical providers, and disability systems and continue to gain acceptance and integration into the care of patients throughout the industrialized world." (p. 18).

6. The Concern of the Ubiquity of Biopsychosocial "Pathology"

The fact raised that "A recent study in nonpatients demonstrated that 49% of 'healthy' people demonstrated biopsychosocial dysfunction on standardized questionnaires⁴¹" (p. 222) reinforces the notion that many patients "bring with them" unique characteristics that often need to be considered in assessment and treatment planning. There is no question that patients bring with them the premorbid histories when they seek treatment for this back pain. The 49% figure cited does not necessarily mean that all these people are in urgent need of any form of treatment. Similarly, the base rates of major psychopathology, such as major depressive disorder (17.1%), anxiety disorders such as panic disorder (3.5%), and substance abuse disorders (26.6%) are quite

high in the general “normal” population who are not psychiatric patients⁴². These individuals have learned to cope with these maladaptive symptoms and behaviors. However, as proposed by many^{5,43-45}, a *diathesis-stress* perspective is emerging as the dominant one to understand why many “biopsychosocial dysfunctions” or “psychopathology” may be significant for some individuals and not others. The diathesis-stress perspective assumes that all patients (spinal care patients or patients with other medical diagnoses) “bring with them” certain pre-existing and predisposing biopsychosocial characteristics (genetics and history that create a *diathesis*) that can then be exacerbated by the *stress* of attempting to cope with a painful or chronic condition that negatively affects activities of daily living. Indeed, the relationship between stress and the exacerbation of mental health problems has long been documented in the scientific literature⁴⁶. This not to say that such predisposing factors make illnesses such as chronic spinal pain a psychogenic disorder and that “it is all in the patient’s head.” Rather, it emphasizes that this chronic problem may represent a complex interaction between physical factors and psychosocioeconomic variables that all need to be effectively managed to ensure therapeutic success. Of course, this means that greater progress and awareness need to be made in the more comprehensive diagnostic process.

7. A Final Concern Regarding the Biopsychosocial Model

Finally, the concern raised by Weiner that the biopsychosocial model “encourages the further medicalization of the patient” (p. 222) is quite perplexing as it turns the entire model on its head. We believe that Weiner’s assertion is illogical and misguided. As we have reviewed above, an illness such as intractable chronic low back pain is not conceptualized as purely a nociceptive problem that simply requires a structural “fix of some broken body part”, but one that results from the interaction of biopsychosocial factors that need to be carefully assessed in

order to then “customize” treatment to the specific needs of the patient – physical, psychosocial, and behavioral. One does not mindlessly prescribe a series of evaluations until the “right one” shows some measured, unique pathophysiology that totally accounts for the syndrome that is then surgically or medically “remediated.” Rather, a step-wise approach is used to progressively establish a comprehensive understanding of the whole problem. The best method to achieve this is to use an integrated team of health care professionals working under one roof, all trained in the biopsychosocial model and, thus, “speaking one language” when evaluating and treating patients. Weiner¹ is quite correct in pointing out the often inappropriate uses of a biopsychosocial “healthcare team” composed of multiple professionals working independently and “handing off” the patient from one to another in a non-integrated fashion. This represents the glaring, iconoclastic, misuse of the biopsychosocial model by inappropriately trained health care specialists. Moreover, third-party payers encourage such a non-integrated approach because of cost-saving reasons.²⁶ When services are “carved out” to different professionals who are not part of the same health-care team, then therapeutic outcomes are less effective!⁴⁷⁻⁴⁹

We believe that Weiner’s article unfortunately creates and then attacks a straw person. As we have enumerated, his critique of the biopsychosocial model is superficial at best, and misleading at least. There is no question that the model can be misused by some, but inappropriate behavior does not undermine the power, utility, and hence importance of the model *per se*.

“Science for its part will test relentlessly every assumption about the human condition... Old beliefs die hard even when demonstrably false.”

E.O. Wilson

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