

Clinical Research

Can Crafted Communication Strategies Allow Musculoskeletal Specialists to Address Health Within the Biopsychosocial Paradigm?

Amanda I. Gonzalez MD, Joost T. P. Kortlever MD, Laura E. Brown PhD, David Ring MD, PhD, Mark Queralt MD

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Abstract

Background Musculoskeletal specialists who attempt to discuss the connection between mental health (thoughts and emotions) and physical health (symptom intensity and activity tolerance) with patients, may fear that they risk offending those patients. In a search for language that creates comfort with difficult conversations, some specialists favor a biomedical framework, such as central sensitization, which posits abnormal central neuron activity. Without addressing the relative accuracy of mind- or brain-based conceptualizations, we addressed crafted and practiced communication strategies as conversation starters that allow specialists to operate within a

biopsychosocial framework without harming the relationship with the patient.

Questions/purposes We measured (1) patient resonance with various explanations of the mind-body connection, including examples of both mind- and brain-based communication strategies, and (2) factors associated with resonance and emotional reactions to the explanations.

Methods In this cross-sectional study, all adult new and returning patients who were literate in English and who attended several musculoskeletal specialty offices were invited to complete questionnaires addressing reactions to one of seven explanations of the mind-body connection assigned using a random number generator. Acknowledging that the relative accuracy of mind-based and nerve- or brain-based strategies are speculative, we developed the following conversation starters: two explanations that were cognitively framed (“the mind is a great story teller”; one positively framed and one negatively framed), two emotionally framed explanations (“stressed or down”; one positively framed and one negatively framed), one mentioning thoughts and emotions in more neutral terms (“mind and body work together ... thoughts and emotions affect the way your body experiences pain”), and two biomedical neurophysiology-based explanations (“nerves get stuck in an over-excited state” and “over-stimulated nerves”), all crafted with the assistance of a communication scholar. It was unusual for people to decline (although the exact number of those who did was not tracked) and 304 of 308 patients who started the questionnaires completed them and were analyzed. In this sample, 51% (155 of 304) were men, and the mean \pm SD age was 49 ± 17 years. Reactions were measured as

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A. I. Gonzalez, J. T. P. Kortlever, D. Ring, M. Queralt, Department of Surgery and Perioperative Care, Dell Medical School, the University of Texas at Austin, Austin, TX, USA

L. E. Brown, Center for Health Communication, Moody College of Communication, the University of Texas at Austin, Austin, TX, USA

D. Ring ✉, Department of Surgery and Perioperative Care, Dell Medical School, The University of Texas at Austin, 1701 Trinity Street, Austin, TX 78712 USA, Email: david.ring@austin.utexas.edu

resonance (a 1 to 5 Likert scale regarding the degree to which the stated concept aligns with their understanding of health and by inference is a comfortable topic of discussion) and self-assessment manikins using circled figurines to measure feelings of happiness (frowning to smiling figures), stimulation/excitement (a relaxed sleepy figure to an energized wide-eyed figure), and security/control (small to large figures). These are commonly used to quantify the appeal and emotive content of a given message. Patients also completed surveys of demographics and mental health. Multilevel multivariable linear regression models were constructed to assess factors associated with resonance, happiness, excitement, and control.

Results Controlling for potential confounding variables such as demographics and mental health measures, a relatively neutral biopsychosocial explanation (“mind and body work together”) had the greatest mean resonance (4.2 ± 0.8 versus 3.8 ± 0.9 for the other explanations; $p < 0.01$) and the largest regression coefficient for resonance (0.78 [95% confidence interval 0.41 to 1.15]). The next-most-resonant explanations were biomedical (“excitable nerves”, “over-excited state”). Biopsychosocial explanations that mention stress, distress, or cognitive bias (“mind is a great storyteller”) had lower resonance. People with greater unhealthy cognitive bias regarding pain (more catastrophic thinking) were less comfortable with all the explanations (lower resonance, regression coefficient -0.03 [95% CI -0.06 to -0.01]). Emotional reactions were relatively comparable with the exception that people felt less control and security with specific explanations such as “excitable nerves” and “mind is a great storyteller.”

Conclusion Crafted communication strategies allow musculoskeletal specialists to address health within the biopsychosocial paradigm without harming their relationship with the patient.

Clinical Relevance Musculoskeletal specialists may be the first clinicians to notice mental health opportunities. It may be helpful for them to develop and practice effective communication strategies that make mental health a comfortable topic of discussion.

Introduction

Patient stress, distress, and cognitive bias can affect the intensity of pain for a given level of actual or potential tissue damage [9-11, 13, 17, 19, 20]. The influence of meaning and context is well studied as placebo and nocebo effects [8]. The patient-clinician relationship and the specific words and concepts used have direct effects on health that can negate, reinforce, or replace physiological effects of interventions [3, 8]. These lines of evidence establish the superiority of the biopsychosocial over the biomedical paradigm of human illness.

Some specialists worry that foregoing a specific pathophysiological diagnosis [7, 16] and guiding people to the awareness of the importance of misconceptions (cognitive error) and emotions (psychological distress) may harm the patient-clinician relationship and diminish interest in a biopsychosocial approach to health.

As an alternative, some clinicians favor the concept of so-called “central sensitization,” which posits that disproportionate symptom intensity and activity intolerance is a consequence of over-activation of central neurons [21]. Although this concept initially seemed to focus on identifying therapeutic pharmaceutical agents that can address central nervous system neuropathology [21], some have also noted the potential for psychosocial treatments to ameliorate the proposed neuropathology [2]. Putting aside the relative accuracy of theories based on mental health (thought and emotions) compared with theories based on neuropathology, we addressed variations of these concepts as conversation starters that might help people feel comfortable and stay engaged.

Possible benefits of a relative biomedical focus include that patients often crave a pathophysiological explanation for their illness [7, 16], talking about nerves may be less offensive than talking about distress and cognitive bias [2], and a focus on pathophysiology creates an openness to pharmaceutical treatment [21]. Potential disadvantages of theories that emphasize nerves over thoughts and emotions include potential inaccuracy or insufficiency in conceptualization of human illness, medicalization of complex psychosocial phenomena with consequent reinforcement of social stigma and hindrance of adopting the biopsychosocial model, and reinforced avoidance of discussions of the cognitive emotional aspects of illness that evidence suggests is limited more by clinician avoidance than by patient reluctance [1, 12, 18].

Musculoskeletal specialists often are best suited to distinguish social and mental health opportunities from pathophysiological opportunities for improved health. Specialists may often be the first clinicians to identify potential social and mental health opportunities. There is potential benefit in this discernment and potential iatrogenic, financial, and psychological harm in missing the opportunity. Strategic and practiced communication strategies might facilitate open conversations about the worry, despair, and misconceptions that often accompany and worsen musculoskeletal illness.

We measured (1) patient resonance (or comfort) with various explanations of the mind-body connection (such as “I don’t buy it” or “makes sense”), including examples of mind- or brain-based communication strategies, and (2) factors associated with resonance and emotional reactions to the explanations.

Patients and Methods

Study Design

We prospectively enrolled 308 patients in this cross-sectional study between March 2019 and June 2019. All patients were seen at one of four participating orthopaedic offices in a large urban area. We included all new or returning orthopaedic patients aged 18 to 89 years. After the patient's visit with a surgeon, a research assistant who was not involved in patient care (AIG, JTPK, or others who were not authors) explained the study to the patient and asked them to participate. We did not track the very small number of people who declined. We obtained a waiver for written consent; completing the questionnaires represented consent.

Patient Characteristics

Four participants were excluded from the final analysis because they started but did not complete the surveys. After these patients were excluded, there were 304 participants for the final analysis. The mean \pm SD age of the patients was 49 ± 17 years, and 51% (155 of 304) were men (Appendix 1; Supplemental Digital Content, <http://links.lww.com/CORR/A492>). Most of the included patients were white or nonHispanic (67% [205 of 304]), were employed (67% [205 of 304]), and had private insurance (66% [202 of 304]) (Appendix 1; Supplemental Digital Content, <http://links.lww.com/CORR/A492>).

Measures

Each patient read on a tablet one of seven randomly selected explanations for more pain than expected that had been crafted with the assistance of a communication scholar. Five were attempts to make the biopsychosocial paradigm more appealing by directly addressing psychological distress (emotion) and cognitive bias (unhealthy misconceptions). There were two cognitively framed explanations ("the mind is a great story teller"; one positively framed and one negatively framed), two emotionally framed explanations ("stressed or down"; one positively framed and one negatively framed), and one mentioning thoughts and emotions in more neutral terms ("mind and body work together ... thoughts and emotions affect the way your body experiences pain"). Two explanations used a biomedical, neurophysiology-based framework: "nerves get stuck in an over-excited state" and "over-stimulated nerves" (Table 1). We addressed these concepts as conversation starters. We did not address their accuracy.

Participants completed the following questionnaires: a demographic survey including age, gender, race or ethnicity,

marital status, work status, insurance status, level of education, number of people living in the household, number of children living in the household, number of adults living in the household, and number of adults who generate income; the Generalized Anxiety Disorder two-item version; the Patient Health Questionnaire two-item version; the Pain Self-Efficacy Questionnaire two-item version; and the Pain Catastrophizing Scale four-item version.

Patients rated resonance with the explanation of more pain than expected on a 5-point Likert scale from 1 to 5, as follows: "nope, I don't buy it," "this doesn't make sense," "I'm not sure how I feel about this," "this makes sense," and "absolutely, that makes perfect sense." Likert scales are valid for measuring variation in opinion. This specific Likert scale is new and specific to this study, and so no minimum clinically important difference has been defined. Given how the scale is anchored, a difference of about 1 point seems relevant.

We used self-assessment manikins as a commonly used measure of the emotional response to written communication. This method is validated [6], but there is no evidence regarding minimum clinically important differences for this tool. Self-assessment manikins (SAMs), a picture-oriented instrument, were used to measure three affective dimensions of happiness, stimulation/excitement, and security/control in response to the explanations. The happiness dimension ranges from a smiling, happy SAM figure to a frowning, unhappy figure. The excitement dimension ranges from an excited, wide-eyed SAM figure to a relaxed, sleepy figure. The control dimension is represented by an SAM figure that changes in size and ranges from a small SAM figure to a large one; the largest figure represents the greatest feeling of security and control [6]. With respect to written explanations of the mind-body connection, we favored greater feelings of happiness and control and relatively neutral feelings of excitement.

We anticipated that psychological distress and cognitive bias might influence reactions to descriptions of the relationship between mental and physical health. We therefore used measures of symptoms of anxiety and depression and measures of catastrophic thinking and self-efficacy in response to pain as potentially associated variables.

Symptoms of depression were measured using the two-question version of the Patient Health Questionnaire-2 (PHQ-2) [14].

Symptoms of anxiety in the past 2 weeks were measured using the two-item version of the Generalized Anxiety Disorder-2 (GAD-2) with scores ranging from 0 (not at all) to 3 (nearly every day). The total score ranges from 0 to 6, with higher scores indicating more symptoms of anxiety [15].

The Pain Catastrophizing Scale-4 is a four-question measure of unhelpful cognitive bias regarding pain. The questions address rumination ("I worry all the time about whether the pain will end"), magnification ("I become afraid that the pain may get worse"), and helplessness ("I

Table 1. Resonance and emotions associated with various explanations of the mind-body connection

Explanations of the mind-body connection	Resonance		Emotions: Self-assessment manikins		
	Mean ± SD ^a	Regression coefficient ^b	Happiness	Excitement	Control/security ^a
The mind and the body work together. You cannot separate your mind from your body. Thoughts and emotions affect the way your body experiences pain.	4.2 ± 0.8	0.78	3.7 ± 2.2	4.6 ± 2.5	6.4 ± 1.7
Nerves communicate the body's signals to the brain. Nerves sometimes become more excitable when they are overstimulated. In this excited state, the amount of nerve signal needed to cause pain is much lower than usual. With overstimulated nerves, you may continue to feel pain even after the initial injury has passed.	4.0 ± 0.8	0.57	3.9 ± 2.2	5.4 ± 2.3	5.3 ± 1.9
When your nerves perform at their best, nerves signal pain when there is actual or potential damage to the body. If nerves get stuck in an overexcited state, they may send a pain signal even when there is no damage, causing you to feel pain.	3.9 ± 0.7	0.54	3.4 ± 2.4	4.9 ± 2.5	5.6 ± 2.0
Injury and uncomfortable conditions like arthritis cause pain. You feel more pain when you are stressed or feeling a bit down.	3.8 ± 1.0	0.46	4.0 ± 2.6	4.7 ± 2.4	5.6 ± 1.9
Injury and uncomfortable conditions like arthritis cause pain. Sometimes, you experience less pain when you are feeling relaxed or generally satisfied.	3.8 ± 0.7	0.46	3.8 ± 2.3	5.4 ± 2.6	5.3 ± 1.9
Your mind is a great storyteller. If your mind tells a story of strength and capability, you may experience the pain as being less severe.	3.7 ± 1.1	0.35	3.9 ± 2.6	5.0 ± 2.4	6.2 ± 2.0
Your mind is a great storyteller. If your mind tells a story of despair and vulnerability, you will feel worse and be less capable.	3.4 ± 1.2	Reference	3.8 ± 2.4	4.6 ± 2.2	5.3 ± 2.3
Mean ± SD for entire cohort	3.8 ± 0.9 ^c		3.8 ± 2.4	4.9 ± 2.4	5.7 ± 2.0

^aSignificant difference in means.

^bMultiple linear regression of factors associated with resonance; a larger number indicates greater association with resonance.

^cGreater catastrophic thinking and less pain self-efficacy were associated with lower resonance across all explanations.

anxiously want the pain to go away”) on Likert scales ranging from 0 (not at all) to 4 (all the time). The total score ranges from 0 to 16; higher scores indicate greater catastrophic or worst-case thinking [4].

The Pain Self-Efficacy Questionnaire-2 consists of two questions measuring one's ability to engage in normal activities and achieve goals in spite of pain. The total score ranges from 0 (not at all confident) to 12 (completely confident) [5].

Ethical Approval

Ethical approval for this study was obtained from the University of Texas at Austin (protocol number 2019-01-

0084). The study was registered at clinicaltrials.gov (NCT04482348).

Statistical Analysis

Continuous variables are reported as the mean and SD and discrete variables are presented as proportions. To assess the correlation of resonance and SAMs with independent variables, we created multilevel multivariable linear regression models to assess factors associated with resonance and the three SAM dimensions—happiness, excitement, and control—accounting for each of the seven different explanations. To select variables for inclusion in the

multivariable models, we assessed the association of each independent variable with resonance and the three SAM dimensions in a bivariate mixed linear regression model accounting for the seven different explanations. Variables with a *p* value less than 0.10 were moved into the final multilevel multivariable models. In an additional model, we assessed the association of resonance and the three SAM dimensions with independent variables, accounting for the explanations but without them as independent variables. The significance level was set at *p* < 0.05.

An a priori power analysis indicated that a sample of 136 participants would provide 80% statistical power, with alpha set at 0.05 to find a hypothesized correlation of 0.67 with a target correlation of 0.80. To perform the multilevel analysis, 40 participants were required for each explanation, so we aimed to enroll 280 patients. To account for incomplete data, we sought to enroll 5% more.

Results

Resonance of Mind-body Expectations

Controlling for potential confounding variables such as demographics and mental health measures, a relatively neutral biopsychosocial explanation (“mind and body work together”) had the greatest mean resonance (meaning comfort with the concept; 4.2 ± 0.8 versus 3.8 ± 0.9 for the other explanations; *p* < 0.01) and the largest regression coefficient for resonance (0.78 [95% confidence interval 0.41 to 1.15]). The next most resonant explanations were biomedical (“excitable nerves”, “over-excited state”) (Table 1). Biopsychosocial explanations that directly address stress, distress, or cognitive bias (“mind is a great storyteller”) had lower resonance (Table 1). People with greater unhealthy cognitive bias regarding pain (more catastrophic thinking) rated resonance lower across all explanations (regression coefficient -0.03 [95% CI -0.06 to -0.01]; Appendix 2; Supplemental Digital Content, <http://links.lww.com/CORR/A493>).

Emotional Reactions to Mind-body Explanations

Emotional reactions were relatively comparable across explanations with the exception that people felt significantly less control and security with specific explanations such as “excitable nerves” and “mind is a great storyteller” (Appendix 2; Supplemental Digital Content, <http://links.lww.com/CORR/A493>).

Discussion

There is mounting evidence about the importance of the relationship between cognitive, emotional, and social

factors and musculoskeletal symptoms and capability [9-11, 13, 17, 19, 20]. And yet, in our experience, some specialists seem to prefer biomedically framed discussions to this increasingly supported biopsychosocial paradigm, perhaps due to fear of offending people by seeming dismissive of their physical symptoms. We compared resonance with and emotional reactions to relatively brain-based (biomedical) and relatively mind-based (biopsychosocial) explanations for the mind-body connection among people seeking musculoskeletal specialty care. Biopsychosocial explanations that directly mentioned stress, low mood, or cognitive bias had relatively lower resonance. But a biopsychosocial explanation of “thoughts and emotions affect the way your body experiences pain” was as resonant as a biomedical explanation and provided greater feelings of security and control. Putting aside which strategy is more accurate, specialists can feel comfortable that crafted and practice strategies for discussing the mind-body connection are relatively equally likely to keep people engaged in the conversation whether they mention the relationship of the mind and the body directly or use biomedical, neurophysiological explanations.

Limitations

This study should be considered in light of some limitations. First, the explanations were limited to a sentence or two, which is a brief explanation of a complex issue. However, the explanations might represent a starting point for further discussion. These written explanations must be studied when used verbally in patient encounters to better measure their utility, but this can be considered a useful and practical first step. Second, only 40 patients viewed and rated each explanation, and larger groups might be used to compare explanations. We were interested in relatively large differences and are therefore satisfied with the level of statistical power. Third, two-thirds of the enrolled patients were white or nonHispanic and had private or military insurance; these patients might not represent the general population, although we think our findings are representative of human tendencies. Fourth, the reader might be wondering which explanation is “correct.” That is a matter of debate which may never be resolved. We take the perspective that the more important consideration is which concepts best help people get and stay healthy over the long term. Future research can test the relative appeal of treatments like cognitive behavioral therapy, uptake of such treatment, and treatment effectiveness using the different conceptualizations. Fifth, some readers might hold the opinion that this study might be more applicable to a subset of patients with specific illness characteristics. In our opinion, by enrolling nearly consecutive patients in various

offices, we have a representative cross-section of patients seeing a musculoskeletal specialist. The associated variation in location, severity of pain, and capability makes it easier to look for correlation with resonance with and emotional reactions to various explanations of the relationship between mental and physical health. Sixth, including several mental health measures risks destabilizing the multivariable models. Although we did not encounter problems with the models, the reader should be aware that while catastrophic thinking was most frequently retained in the models, the other mental health measures also are important.

Resonance of Mind-body Explanations

The observation that an explanation for the mind-body connection that addressed thoughts and emotions without specifically naming stress, mood, or misconceptions resonates as well or better than biomedically framed explanations demonstrates the importance of effective communication strategies for realizing the known advantages of the biopsychosocial paradigm of human illness in musculoskeletal specialty care [1, 3, 12, 18]. Biomedical explanations based in the concept of central neuropathology were more resonant than biopsychosocial explanations that addressed stress, mood, and misconceptions directly, which may explain some of the appeal of biomedically framed explanations of disproportionate symptoms and activity intolerance [7, 16, 21]. The tension between the two approaches is evident in this quote from Woolf [21]: “That a central amplification of pain might be a ‘real’ neurobiological phenomenon, one that contributes to diverse clinical pain conditions, seemed to [people emphasizing the influence of mental and social health] to be unlikely, and most clinicians preferred to use loose diagnostic labels like psychosomatic or somatoform disorder to define pain conditions they did not understand.” All of the mind-body explanations were less resonant in proportion to greater worst-case (catastrophic thinking), suggesting that unhelpful cognitive biases about pain make considerations of the mind-body connection less appealing. What prior research demonstrates is that a greater tendency to consider thoughts as facts (cognitive fusion) is associated with a greater impact of cognitive errors, such as worst-case thoughts have a greater impact on symptoms and capability [17]. In other words, asking people to rethink things is akin to questioning their personal truth or reality, which is one reason discussions about misconceptions and emotions have the potential to offend. One interpretation of these data is that specialists who encounter patients with illness disproportionate to their pathophysiology might attempt to use unpracticed communication strategies to introduce the

biopsychosocial paradigm and receive unpleasant reactions from patients, particularly those with greater catastrophic thinking [1, 17]. This may induce specialists to retreat to biomedically framed discussions [7, 16, 21]. Our evidence confirms that these discussions are difficult and potentially offensive (relatively limited resonance), while seeming to affirm that crafted and practiced strategies can be emotionally comfortable. We conclude that discussions within the biopsychosocial paradigm can be effective when strategized and practiced [1, 3, 12]. We look forward to studies that address the relative harms and benefits of concepts based in the biopsychosocial compared to the biomedical framework.

Emotional Reactions to Mind-body Explanations

We observed limited variations in emotional reactions to the descriptions of the mind-body connection, with one exception: The most resonant biomedical explanation seemed to provide lower feelings of security and control than the most resonant biopsychosocial explanation. One speculation is that this might reflect a sense that one may have less direct control over neurons than thoughts and emotions. Qualitative studies might help discern the nuances in reaction to these explanations.

Conclusion

Noting that the mean resonance of the best explanations reached the level of “this makes sense” while the lower-rated explanations were closer to “I’m not sure how I feel about this,” it is no wonder musculoskeletal specialists are careful about how they address symptom intensity and activity intolerance disproportionate to the observed pathology. The resonance and emotional comfort with crafted explanations of how thoughts and emotions affect human illness suggest that specialists can make these comfortable topics of conversation with strategy, training, and practice. We did not address the relative accuracy and the potential benefits and potential harms of explanations framed in the biomedical rather than the biopsychosocial framework; we addressed them merely as conversation starters. Additional research in these areas is merited. In particular, we wonder whether the expediences associated with initial avoidance of discussions about misconceptions and distress are important to building a trusting patient-clinician relationship and perhaps associated with greater potential benefits over time. Or perhaps it is better to connect with patients about mental and social health opportunities early in care to avoid reinforcing misconceptions and stigma, medicalizing common aches and pains, and overemphasizing biomedical treatments of uncertain effectiveness that might

represent a distraction from more effective interventions rooted in the biopsychosocial framework [1].

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