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Masterclass

Conceptual models for implementing biopsychosocial theory in clinical practice

M. Jones,* I. Edwards,† L. Gifford‡

**School of Physiotherapy, Division of Health Sciences, University of South Australia; †Brian Burdekin Clinic, Adelaide, Australia; ‡Chartered Physiotherapist, Falmouth, UK*

SUMMARY. **The integration of the biopsychosocial model into manual therapy practice is challenging for clinicians, especially for those who have not received formal training in biopsychosocial theory or its application. In this masterclass two contemporary models of health and disability are presented along with a model for organizing clinical knowledge, and a model of reasoning strategies that will assist clinicians in their understanding and application of biopsychosocial theory. All four models emphasise the importance of understanding and managing both the psychosocial and the biomedical aspects of patients' problems. Facilitating change in patients' (and clinicians') perspectives on pain and its biopsychosocial influences requires them to reflect on their underlying assumptions and the basis of those beliefs. Through this reflective process perspectives will be transformed, and for clinicians, in time, different management practices will emerge. © 2002 Elsevier Science Ltd.**

INTRODUCTION

There is often a significant gap between the emergence of new or revised theory and changes in practice (Linton 1998; Muncey 2000). Indeed, there may even be reluctance on the part of clinicians to implement new or revised theory in clinical practice (Silagy 1998). Muncey (2000) reviewed factors that contribute to this, two of which relate to therapists' knowledge and clinical decision making skills. In this paper we discuss the integration of the biopsychosocial model into manual therapy practice. We highlight, by means of an abbreviated patient example, how two recent conceptual models of health and disability, linked with two models of clinical reasoning, can assist therapists in implementing emerging biopsychosocial theory into their clinical practice.

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Mark A. Jones, BS (Psych), Cert Phys Ther, Grad Dip Advan Manip Ther, MappSc (Manip Ther), Senior Lecturer, Director, Graduate Programs in Manipulative Physiotherapy, International Coordinator, School of Physiotherapy, Division of Health Sciences, University of South Australia, **Ian Edwards PhD, Grad Dip PT (Ortho), BappSc,** Physiotherapist Alfreda Rehabilitation; Brian Burdekin Clinic, Adelaide, Australia, **Louis Gifford BSc, MappSc, MCSP,** Chartered Physiotherapist, Falmouth, UK.
Correspondence to: MAJ, School of Physiotherapy, Division of Health Sciences, University of South Australia, North Terrace, Adelaide, South Australia, Australia 5000.
Tel.: +61 8 8302 2549; Fax: +61 8 8302 2766;
E-mail: mark.jones@unisa.edu.au

Success in applying new knowledge and changing practice thinking and behaviour requires both an appropriate organization of knowledge within which new theory can be integrated, and a critical, reflective clinical reasoning process to successfully apply that knowledge. Clinical reasoning has been defined as that process in which the therapist, interacting with the patient and significant others (e.g. family and other health care team members), structures meaning, goals and health management strategies based on clinical data, client choices and professional judgement and knowledge (Higgs & Jones 2000). Therapists' proficiency in clinical reasoning is closely related to their personal perspectives of health and disability. While basic process errors in clinical reasoning, such as limited hypothesis generation and overemphasis on a favourite hypothesis are common (Jones 1992), perhaps the greatest limitation to therapists' reasoning is the breadth, depth and accuracy of their clinically accessible knowledge (Elstein et al. 1990; Hassebrock et al. 1993; Patel & Groen 1986; Patel et al. 1990; Schmidt et al. 1990). The body of pain science literature is immense and often presented at a basic science level that is difficult for non-researchers to absorb and transfer to the clinical setting. There is also debate within medical education regarding the level of biomedical knowledge practicing clinicians retain (e.g. Boshuizen & Schmidt 2000; Patel & Arocha 2000) with considerable evidence suggesting that the basic sciences are

not well integrated into clinicians' organization of clinically accessible knowledge (Patel & Arocha 2000). As Hislop (1985) argues, we must be critical of the level of knowledge we attempt to take on board and keep in perspective what we need to know versus what is nice, marginal or irrelevant to know. When attempting to organize your knowledge in the difficult field of pain science, conceptual models of health and disability can greatly assist by providing a broad framework whereby clinical knowledge (e.g. clinical patterns and management strategies) and basic science knowledge (e.g. physiological processes underpinning pain) can be brought together to facilitate their application in practice. To illustrate, two contemporary models of health and disability are introduced and aspects of these are discussed followed by a brief review of the notion of hypothesis categories as a means of organizing clinical knowledge. Finally, the important role of specific reasoning strategies, validated in recent physiotherapy research (Edwards et al. 2001; Edwards et al. *submitted,* Jones et al. 2000), is emphasized in the application of these models in practice.

THE MATURE ORGANISM MODEL

Traditionally, the biomedical model of health and dysfunction has viewed patients' disability and impairments as a reflection of their underlying tissue and system pathology (Main & Spanswick 2000; Waddell 1998). Accordingly, manual therapy examination was predominantly focused on identifying physical impairments in the neuro-musculoskeletal system. Attention to environmental factors (e.g. poor ergonomics causing excessive load and irritation of pathological or sensitized tissues) and psychosocial factors (e.g. patient understanding and psyche as it relates to motivation and compliance) are not new. Typically, these factors have been considered from the perspective of how they may be obstructing the normal recovery process and contributing to the patient's pain state and participation in the broader management. While these issues are important, contemporary understanding of health and disability requires further consideration of the influence environmental and psychosocial factors may have on patients' perceptions and health behaviours (Main & Booker 2000; Main & Burton 2000; Main & Parker 2000).

Gifford (1998a) has proposed a model of health and disability he calls the Mature Organism Model (Fig. 1). The model attempts to portray the interactions of the fundamental pathways into and out of the central nervous system that contribute to the maintenance of health and the development and continuation of poor health (e.g. pain and disability).

Tissue health is sampled and communicated along with contextual information about the environment, including the immediate environment surrounding an injury and the ongoing environment that makes up a person's pain or illness experience, via *input mechanisms* (i.e. all sensory pathways). The brain can then be said to scrutinize (both consciously and unconsciously/involuntarily) incoming information. If sensory inputs reach a conscious level they may be

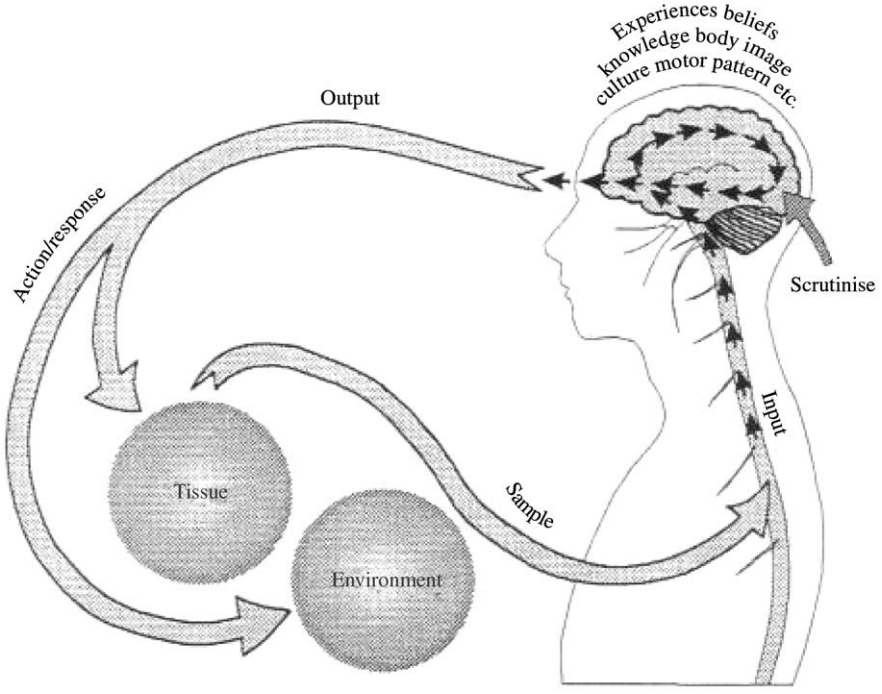

Fig. 1—The Mature Organism Model.

scrutinized alongside, and be influenced by, existing engrams of relevant past experiences, beliefs and attributes. Ultimately, all information is *processed* in order to mount a response via the *output mechanisms* (i.e. somatic motor, autonomic, neuroendocrine, neuroimmune, and descending feedback/control systems). How an individual thinks and feels about a given situation has profound effects on the physiological, psychological and behavioural 'output' responses generated, which in turn affects how the person's health is manifest. In this way it is possible to see that even given the same extent of tissue injury or illness, no two people will have exactly the same presentation, as how they manifest their pain or illness is shaped in part by who they are and how they and their unique system responds. Hence it is inadequate to simply focus on physical diagnosis and physical or environmental factors that may be contributing to the maintenance of the patient's problem(s). Managing patients' problems also requires the understanding of their unique pain or illness experiences (determined by making enquires about such things as their understanding, beliefs, feelings and coping strategies in relation to their problem). While all input, processing and output mechanisms will be in operation in any state of ill health, they will not all necessarily be dysfunctional (i.e. contributing to the problem and/or be counterproductive to recovery).

Manual therapists therefore must have the necessary knowledge organization and reasoning skills to distinguish between adaptive/helpful and maladaptive/unhelpful mechanisms and responses. Even those problems that are seen as primarily nociceptive or residing in the tissues can be occurring alongside maladaptive psychological or behavioural 'responses' and thus provide powerful barriers to active rehabilitation and the restoration of physical confidence. For example, dealing with cognitive and affective issues (e.g. poor understanding and unhelpful fears) in a person with a 'nociceptive' presentation should have priority over dealing with the nociception itself, recognizing at times attention to physical impairment provides the entry to dealing with any cognitive/affective issues. Thus, a patient may have a lack of insight to the factors influencing their problem which, until addressed (through inquiry and management) can create obstacles to their improvement.

Consider a patient presenting with a gradual onset and 18 month history of continual facial/TMJ area headaches with associated disabilities in work (nurse practitioner) and family/home care activities. Successful management of this patient's problem requires examination directed toward understanding a multiplicity of issues and how they interact in the presentation. For example, explicit within the Mature Organism Model this would include biomedical (input related) and psychosocial (input, scrutinizing, output related) assessment of factors potentially affecting posture and function (e.g. movement and tissue impairment and environmental considerations such as ergonomics). Similarly judgements regarding *Processing* and *Output* mechanisms must be made from attention to the broad spectrum of issues influencing each (e.g. cognitive, affective, motor control and immune/endocrine function). In this example the Mature Organism Model helps to clarify the links between different pain mechanisms as manifest through the patient's presentation. One feature of this patient's presentation was her ineffective coping style while under pressure (work and demands of a two-year-old), and resultant learned motor patterns (e.g. continual mandibular clenching in response to stress). The remaining three models featured through this paper will be discussed with respect to these two aspects of her presentation (lack of awareness of pain producing behaviour and maladaptive motor patterns).

The Mature Organism Model was developed to encourage and allow therapists (and patients) to be able to consider openly and without prejudice the multiple factors and multiple levels involved in all pain presentations. It provides a broad conceptual framework from which any of its elements (e.g. tissue mechanisms, pain mechanisms, effector mechanisms and psychosocial factors) and their respective clinical features or inter-relationships can be explored further. For example, Main et al. (2000) have proposed an extended biopsychosocial model of disability (Fig. 2) from that originally put forward by Waddell (1992).

BIOPSYCHOSOCIAL MODEL OF DISABILITY

The model by Main et al. (2000) expands on the psychosocial influences inherent in the Mature Organism Model by illustrating the interactions between factors such as pain and deconditioning, fear and avoidance, depression, anger and frustration, iatrogenics, family, socioeconomic and occupational factors.

As with the Mature Organism Model, the value of this model of disability is its ability to portray the multitude of interactions possible within its elements. From there, any element can then be explored further again. For example, the relationship between injury, pain and the development of deconditioning and disuse is captured in the upper left-hand corner of the diagram. The specific effects of physical deconditioning such as reduced cardiovascular function, restricted joint and soft tissue mobility, reduced muscle function and motor control, poor sleep and alteration of mood also can be examined more closely including the associated clinical features and their pathophysiological basis (Michel & Wittink 1997).

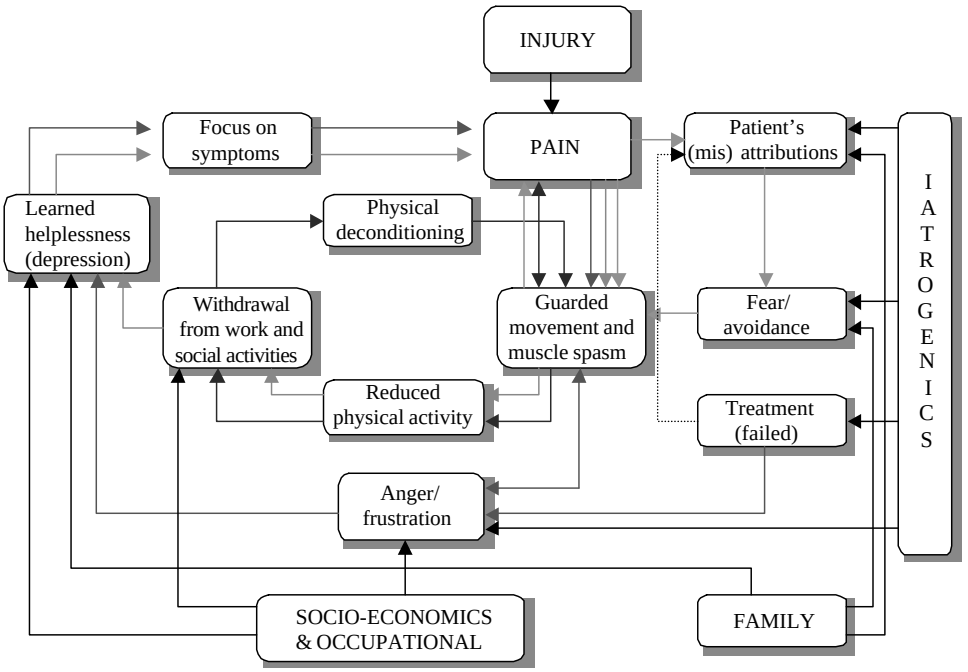

Fig. 2—Model of disability illustrating influences of biomedical, physiological, psychological, socioeconomic and iatrogenic factors on disability (Reprinted from Pain Management, an interdisciplinary approach, 2000 Main et al. by permission of the publisher Churchill Livingstone).

Another factor influencing disability is the patients' thoughts and feelings about their problems. For example, fear and avoidance are seen to be directly related to patients' beliefs and attributions as formed from their own concept of pain and health (with links to life events, personality factors, previous pain experience, and coping strategies) (Hill 1998; Waddell et al. 1993) as well as from direct influences of iatrogenics (e.g. advice from health professionals and effects of previous treatment interventions) and family. An aspect of understanding and family influences evident in our patient example was her lack of awareness of the factors contributing to her symptom provocation (e.g. stress and anger resulting from the work-load and pressure of being a working mother with a two-year-old son and having difficulty coping with a demanding mother-in-law's expectations).

Again, the model of disability will assist therapists to appreciate these interactions, each of which has its own associated body of literature that can be considered further. For example, Philips (1987) discusses the scope of avoidance patients may display including avoidance of pain, activity, socializing and leisure. In our patient, an avoidance of conflict with her mother-in-law meant her anger was poorly dealt with allowing her teeth clenching (and headaches) to persist without recognition of this causal link.

The intent here is not to provide a thorough review of these factors and associated research. Instead, the two models chosen (Gifford's Mature Organism Model and Main et al.'s Model of Disability) and examples highlighted were selected to depict the breadth and depth of knowledge therapists must strive to organize in order to begin to more effectively use this knowledge in practice. Equipped with conceptual models such as these, the therapist is then able to better appreciate the scope of factors that must be considered in assessing and managing patients with pain. Clinical decisions (for and with the patient) can then be based on a broader assessment of the complete problem, including associated cognitive, behavioural and emotional factors.

HYPOTHESIS CATEGORIES

Success in application of any new concept, model or research finding relates to how well the new information can be integrated into the therapists existing organization of knowledge. Pain science is of course not new and physiotherapy literature challenging clinicians to embrace contemporary understanding of pain and its determinants is also not new (Butler 2000; Gifford 1998b, 2000; Gifford & Butler 1997; Shacklock 1995, 1999a,b; Zusman 1997, 1998). Elsewhere (Christensen et al. in press; Gifford 1997; Gifford & Butler 1997; Jones 1987, 1992, 1995; Jones et al. 2000; Jones & Rivett in preparation), a model of knowledge organization for the understanding required of therapists regarding patients and their

Table 1. Hypothesis categories

- **Functional limitation and/or disability** (physical or psychological limitations in functional activities and the associated social, occupational and economic consequences)
- **Pathobiological mechanisms** (tissue healing mechanisms and pain mechanisms)
- **Physical and psychosocial impairments and their associated sources**
- **Contributing factors**
- **Precautions and contraindications to physical examination and treatment**
- **Management and treatment**
- **Prognosis**

problems has been proposed under variations of the following 'Hypothesis Categories' (Table 1).

These sorts of hypotheses should be formulated within broader conceptual models of health and disability such as the two discussed here. The model of Hypothesis Categories will assist therapists to relate the various elements of Gifford's and Main et al.'s models to the particular types of clinical decisions required in contemporary manual therapy.

While models such as these will assist therapists' organization of knowledge in this area, therapists must also further develop their practice skills in these facets of patient assessment and management. That is, just as therapists must have advanced skills in assessment of physical impairment in the neuromusculoskeletal system, they must also have skills in assessment of the different factors potentially contributing to a patient's disability. Physiotherapists have generally learned the skills of psychosocial assessment and management (e.g. listening, communicating, negotiating, counselling and motivating) to effect positive changes in their patients' health understandings, beliefs and behaviours through personal experience. While reasoning directed toward understanding the psychosocial influences and the effects a patient's problem is having on their life is increasingly being made more explicit in manual therapy curricula, psychosocial assessment, management and reasoning have historically not been given the same attention as has clinical reasoning directed towards physical disability and impairment (Butler 2000; Watson 1999;Watson 2000). As such, the requisite knowledge and interpersonal skills required are often tacit and less developed in some therapists.

A qualitative study by Edwards et al. (2001) investigating the clinical reasoning of peer-designated expert physiotherapists in three different fields of physiotherapy (manual therapy, neurophysiotherapy and domiciliary care) found that these physiotherapists, regardless of setting, had intentionally developed (and highly valued) a wide variety of clinical practice skills (including those of interaction and collaboration). Each of these skills required a particular orientation of clinical reasoning termed clinical reasoning strategies.

CLINICAL REASONING STRATEGIES

Clinical reasoning strategies can be regarded as specific foci of thinking or action in the diverse tasks of clinical practice in physiotherapy (Table 2). These clinical reasoning strategies may be found combined in any number of ways according to the particular situations which arise in clinical practice. Furthermore, even though there is, on occasion, considerable overlap between clinical reasoning strategies, each clinical reasoning strategy requires an orientation of thinking and action, which is not wholly subsumed by the others.

Diagnostic reasoning, relying predominantly on application of the empirico-analytical or scientific paradigm for decision making/validation, is that form of reasoning which seeks to identify and test hypotheses concerning the nature of the patient's physical and psychosocial impairments and their functional limitations or disabilities. This involves the therapist clarifying (as appropriate) the pathobiological pain mechanisms, associated movement impairments, hypothesized anatomical sources and potential contributing factors to these problems. In contrast, narrative reasoning fits within an interpretive paradigm where truth is contextually bound and not considered absolute (Denzin & Lincoln 1994). Narrative reasoning is used to understand the patient's particular illness or pain experience (Mattingly 1991, 1994). It is far more challenging than merely hearing or piecing together patients' stories. It must be recognized that the patients' stories (or narratives) represent their interpretations of events over time (a reasoning process in itself). It is also critical to understand that patients' stories may not be neutral in their effects on their illness experiences (including pain) (Kleinman 1988; White & Epston 1991), their ability to make choices and learn (Mezirow 1990, 1991) or, as a result, on treatment outcomes (Borkan et al. 1991). Herein lies the need for narrative reasoning, where the presuppositions underlying the beliefs of patients (and even therapists), to be laid open to critical reflection. This

Table 2. Clinical reasoning strategies representing tasks within clinical practice (Edwards et al. 2001)

- Formation of diagnosis (diagnostic reasoning)
- Understanding the client and their context (narrative reasoning)
- Determination and carrying out of treatment procedures (reasoning about procedure)
- Establishing therapist – patient rapport (interactive reasoning)
- Nurturing a collaborative approach towards deciding and implementing goals of treatment (collaborative reasoning)
- Engaging in individualized and context-sensitive teaching (reasoning about teaching)
- Envisioning future scenarios with clients and exploring their choices and their implications (predictive reasoning)
- Apprehension and resolution of ethical and pragmatic dilemmas (ethical reasoning)

means that narrative reasoning must be subjected to as much rigour as is required of testing and confirming hypotheses in diagnostic reasoning.

These different forms of 'knowing' the patient (and his or her problem[s]) in clinical practice are similar in nature to different paradigms of research (Denzin & Lincoln 1994; Depoy & Gitlin 1998), each having particular 'rules' of first acquiring and then testing or validating knowledge or data. Where diagnostic reasoning aims (within the limitations of available gold standards of validation) to validate information or data acquired from the patient through empirical, objective testing, in narrative reasoning validation of a hypothesis is through therapist-patient consensus.

Diagnostic and narrative reasoning are well described in the clinical reasoning literature as forms of inquiry (Benner et al. 1996; Elstein et al. 1990; Mattingly 1994; Hayes Fleming 1994) in clinical practice. The challenge for physiotherapists, having gained a multi-dimensional or biopsychosocial understanding of the patient, is what to do about it? How can this understanding be integrated into the physiotherapy management of the case? In the study by Edwards et al. (2001) it was found that the therapists, in each setting, were able to work in both these different spheres (the biomedical and the psychosocial), by means of the reasoning strategies. That is, they were able to address the various and diverse issues that inevitably arose from their comprehensive patient evaluations, characterized as they were by both diagnostic and narrative reasoning processes.

It is beyond the scope of this paper to outline each of the reasoning strategies in detail. The reader is directed to Edwards et al. (2001, submitted) for a more comprehensive account of the research and exposition of the clinical reasoning strategies. However, for the purpose of demonstrating how clinical reasoning strategies can be employed in managing patient problems whilst taking into account the case's biopsychosocial dimensions, the strategy 'reasoning about teaching' will be considered in relation to the previous patient example.

It is firstly important to remember, however, that managing patient presentations in a biopsychosocial model, even in the context of manual therapy, involves acting, at times, within an interpretive paradigm as well as an empirico–analytical one. Changing the understanding and behaviour (of either therapist or patient) requires transforming existing perspectives. In turn, changing existing perspectives requires reflection on the basis of those perspectives or beliefs. Achieving a mutually agreed understanding of patients' perceptions or experiences of their pain (or other disability) and the subsequent impact on their lives is described as a *communicative* action between therapist and patient (Mezirow 1991). This process has now moved from inquiry into management where 'understanding' is being translated into clinical action. *Communicative* action stands in contrast to *instrumental* action which is the management or treatment equivalent of diagnostic reasoning where the effect of an intervention (such as a joint mobilization) is able to be empirically observed or measured. *Communicative* action opens the way for transformative learning to occur whereby presuppositions of current beliefs are re-examined opening the way for new, revised perspectives (Mezirow 1990; 1991). Such revised perspectives, in turn, are more constructive interpretations of events that allow patients to make better decisions in respect to their health, in general, and the management of a condition, such as ongoing pain, in particular. Both the conceptual models previously described show how patients make 'decisions' regarding their pain or disability which can in fact lead to greater pain experience or disability.

Consider the following example of the reasoning strategy of 'teaching' applied to our patient with the longstanding headaches. In this case both instrumental and communicative forms of teaching are required in the management. It is important to remember that in describing these forms of teaching we are referring to only one aspect of management. Other manual therapy treatment interventions such as active and/or passive joint mobilization, specific muscle stretching and postural awareness and re-education (including strengthening exercises) may, depending on the findings of the physical examination, also have important roles in the physiotherapy management.

An example of instrumental teaching in this case might be where the therapist, having taken into consideration the possible cervical contributions to our patient's headaches and having assessed the particular motor control patterns of the trunk, head and neck in operation here, decides to concentrate on helping the patient identify and relax some particular facial muscles. The therapist is able to demonstrate to the patient an asymmetry, for example, in excursion of temporo-mandibular movements. Masseter and temporalis are palpated (and at some point shown to the patient on either a chart or in front of a mirror) and proprioceptive neuromuscular techniques such as hold–relax are employed to achieve a relaxation/lengthening of these muscles. The TMJ excursion is reassessed and any differences in range and/or symmetry of movement is observed and noted by the therapist together with the patient. In other words, the patient has learned (been taught) to perform a manoeuvre where through the selective contraction of muscles and their subsequent relaxation, there is a demonstrable effect on a particular variable (i.e. TMJ excursion) as a part of a larger analysis of the situation. The effect of this is empirically observable and measurable at least in

terms of quality of movement. Naturally, motor control management would also address other trunk, head and neck patterns deemed to be contributing to this specific hyperactivity impairment.

The communicative teaching in this situation, however, is quite different but, nevertheless, takes place in conjunction with the instrumental teaching above. Here, the intent is to foster insight in our patient with regard to the factors which may be contributing to the ongoing production of her headaches. The relationship between behaviours (e.g. chronic teeth clenching), and symptoms (e.g. headaches), may not be at all self-evident to the patient. In fact, during the day the points at which teeth clenching behaviour is most prevalent may not even be evident to her. This points to the need for the person to, firstly, gain insight through personal reflection and then, possibly with the help of others, to be able to practise observing such connections. This can be achieved through a number of strategies. One example of such a strategy might involve the selective and discreet use of the experiences (or narratives) of others by which to provide alternative or new perspectives by which our patient can reflect on her situation. Such an approach is discussed further elsewhere (Edwards et al. 2001). In any case the common process in this form of communicative teaching is that kind of adult learning process discussed earlier–transformative learning (Mezirow 1991).

In order to engage in *communicative* action, therapists as well as patients may need to at times critically reflect on the basis of their beliefs so that distortions in meaning perspectives (beliefs) may be identified and corrected. Such open reflection of oneself is no easy task, as Brookfield (2000) points out:

> No matter how much we may think we have an accurate sense of our practice, we are stymied by the fact that we are using our own interpretive filters to become aware of our own interpretive filters! ... To some extent we are all prisoners trapped within the perceptual frameworks that determine how we view our experiences. A self-confirming cycle often develops whereby our uncritically accepted assumptions shape clinical actions which then serve only to confirm the truth of those assumptions.

Because of this, it is difficult for therapists to effectively explore their own assumptions. The discipline of clinical reasoning, however, enables therapists to acquire the skills to critically reflect on their own decision making, knowledge structures and the underlying assumptions behind them. Reasoning in an interpretive mode (such as narrative or communicative), importantly, also involves a similar process of fostering critical reflection in the patient regarding their decision making, knowledge (or understanding) of their problem and the assumptions behind these in order to facilitate transformative learning.

CONCLUSION

The models of health and disability (Gifford 1998a and Main et al. 2000) and the models of clinical reasoning (Jones et al. 2000, Jones and Rivett *in preparation*, Edwards et al. 2001) outlined in this article link the understanding, organization and application of new or emerging knowledge (in this case biopsychosocial theory) to clinical practice. Each can assist transformative learning. When successful, therapists' interpretation of clinical features will change and in time, different management practices will emerge. Similarly, successful transformative learning for patients results in new perspectives regarding their problem(s), the factors contributing to their problem(s) and the changes required (understanding, emotions, behaviours, environmental, physical) for better health and function. Taken together, the ability to examine underlying assumptions behind the beliefs and actions of both therapist and patient opens the way to more constructive forms of communication and collaboration (Brookfield 2000; Mezirow 1991).

All four models emphasize the importance of understanding and interacting with patients and their belief systems in a way which neither emphasizes the psychosocial aspects of clinical practice in physiotherapy or the biomedical aspects but rather shows their relationship.

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