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TITLE: SPINAL MANIPULATION AND THE PREVENTION OF DYSFUNCTION AND DISABILITY

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DESCRIPTION: The Physical Therapy profession plays a major role in the prevention of musculoskeletal disorders and disability. Activity-related spinal disorders are the most frequent and costly musculoskeletal disorders. These disorders are the leading cause of disability in working age adults. The majority of these common ailments are the product of lifestyle habits and degenerative changes associated with aging. This presentation will address many of the bio-psycho-social challenges involved with shifting from a treatment to a prevention model of intervention for activity-related spine pain disorders. Specifically, the role of spinal manipulative therapy (SMT) in this paradigm shift is explored. The biomechanical and behavioral effects of SMT are evaluated from the perspective of long-term effect and functional self-efficacy. The need for clinicians to distinguish signs and symptoms, pain and nociception, impairment and disability, and maintain a focus to long-term activity-tolerance is emphasized. A ‘manipulation’ of perspective enables the clinician to use SMT as a prevention tool. The speaker will discuss how he has incorporated SMT in to a system for the prevention of injury and disability across a wide range of industrial and clinical settings. The premise is that prevention services are true healthcare, whereas treatment after a disease, disorder or injury has occurred is illness-care. These two divisions of service need to be linked by a common philosophy of care.

OBJECTIVES:

1. The manual therapist will recognize the common biomechanical elements in techniques used by different ‘schools of thought’ in spinal manipulative therapy (SMT).
2. The manual therapist will identify common goals for the treatment of activity-related spine pain disorders.
3. The manual therapist will identify the ability of SMT to address root causes for spine pain disorders and disability.
4. The manual therapist will identify the role of SMT in developing a model for education and training to prevent the onset, recurrence or progression of spine pain disorders and disability.
5. The manual therapist will identify the role of SMT in developing a model for individuals to regain, maintain and/or enhance activity tolerance.

The Physical Therapy profession has entered this new millennium poised to take the leading role in musculoskeletal care. We are a unique healthcare profession, in a unique position to influence attitudes, practices and beliefs regarding the epidemic of musculoskeletal problems that plague our society. This influence depends on our ability to organize and mobilize efforts along clinical,

educational, research, political and multimedia fronts. A major area of concern and the ultimate goal in musculoskeletal healthcare is the prevention of injury and disability.

This presentation addresses concepts related to prevention of the onset, recurrence and progression of activity-related musculoskeletal pain disorders. I will specifically discuss the role of spinal manipulative therapy (SMT) in the development of our injury prevention model. This model has been used in a wide range of industrial settings over the past 20 years. Our approach, called the Duffy-Rath System©, links treatment and prevention strategies into an ongoing system for musculoskeletal wellness. Our background and experience with manual therapy has played a major role in the development and evolution of this approach. I will start the discussion by providing a definition for the three key terms in the title and establishing three general goals for musculoskeletal treatment.

- **Spinal manipulation** - the purposeful and controlled application of biomechanical force(s) to the spine with the intent of relieving relevant signs and symptoms, and restoring physical function.
- **Dysfunction** – an abnormal state of physical function due to injury, disease, disuse, degeneration or physical neglect.
- **Disability** – the inability of an individual to perform their normal activities of daily living because of a perceived, actual or determined state of physical incapacity.
- **Treatment Goals** – the three general goals for musculoskeletal treatment are: 1) control the relevant symptoms, 2) restore and/or enhance normal activity-tolerance, 3) develop a long-term plan to sustain or complete achievement of goals 1 and 2 after clinical treatment has ceased.

With these definitions and treatment goals in mind, let us discuss the role of SMT in the treatment of activity-related musculoskeletal disorders. Then we can investigate ways to use SMT concepts and procedures before a back or neck pain episode occurs. Our philosophy for musculoskeletal care emphasizes the importance of linking treatment and prevention programs into a health and wellness continuum.

SMT can be delivered in many different forms, with varying rationales and theoretical models. Manual techniques can have a mechanical, physiological and/or a psychological effect on the individual. However, in spite of the many proposed differences in technique and theory, there are many common elements amongst all of the prominent ‘schools of thought’ in manual therapy. Three common denominators are: 1) there is a system of assessment to identify and characterize the ‘lesion’ that requires manipulation, 2) there is the application of force to move the spinal articulation(s) and/or have a specific biomechanical effect upon the soft tissues with the application of a manipulative procedure, and 3) there is the expectation of an immediate change in signs and/or symptoms as a result of the application of the technique.

This is a basic clinical process that has been in practice since recorded medical history, and (interestingly) many of the manual tools we use today have not changed for hundreds of years. Upon close assessment of the most frequently used manual procedures, the different ‘schools of thought’ use the same or very similar tools. When the title and description is removed, the patient’s position, the operator’s manual contact and line of drive look remarkably similar for

‘supposedly’ different techniques. It is fascinating how the same (basic) biomechanical procedures can have so many differing descriptions and explanations.

When a spinal manipulative technique is performed, the clinician determines its immediate effect by assessing for a change in symptoms, motion and/or a predetermined functional test. I propose that there is greater clinical significance to the improvements when; 1) they are lasting, 2) they help the patient to return to their normal level of activity, and 3) they encourage self-efficacy. SMT does not necessarily achieve any of these three results. The chance of achieving these results is increased when SMT is connected to patient education, physical training and directly to overcoming specific difficulties the individual is having in daily function.

This is where the physical therapist has a unique advantage over other health care disciplines. Many physical therapists have linked basic concepts of SMT to function and self-efficacy. McKenzie has promoted the connection between manipulative techniques and patient exercise. Mulligan has applied mobilization procedures to movement and functional tasks. Spinal stabilization has taken basic biomechanical concepts and applied them to specificity of exercise, with the intent of restoring safe physical function. Many others, too numerous to mention, have made significant contributions in this area of Physical Therapy practice. The next generation(s) of therapists must continue to move these ideas and contributions forward into a complete package. Ultimately, we need to continue to search for those diagnostic and therapeutic approaches with the greatest research support for target populations of spine pain patients.

My definition of spinal manipulation purposely places an emphasis on the importance of controlled biomechanics and functional effect. Conversely, it intentionally de-emphasizes high velocity thrust as the ‘centerpiece’ of the definition. This provides latitude to the type of manipulative tools that can be used. It also encourages us to take a generic look at SMT procedures and the patient’s response to their application. Our greatest clinical concern should be patient selection, safety and functional efficacy for each individual patient that receives our care. Ultimately, in spite of RCT evidence of efficacy, our responsibility is to the most effective and efficient care for each individual patient that we treat.

Taking these treatment concepts into the prevention arena requires a change of orientation to the management of back and neck pain problems. You are forced you to look at the long-term, larger issues. Key questions you need to wrestle with include: 1) what are the root-causes for back and neck pain disorders? 2) What are the possible clinical sequellae and functional consequences of the experience? 3) How does the caregiver influence the events and outcome? 4) What control does the individual have over their physical health and abilities? As I wrestled with these issues I found that my approach had to change.

Let us first look at the issue of root-cause(s) for these disorders. The majority of activity-related spine pain disorders are not the result of a traumatic event (5 – 15 %). Most of these disorders are the result of cumulative/repetitive stress and strain. This means that lifestyle habits and degenerative changes associated with use and aging play a predominant role. Treatment procedures provided for a number of minutes, over the course of several weeks cannot address this root cause.

We performed a consecutive case series investigation at one of our industrial clinics (N = 1,331) to study the mechanism of onset for patients with musculoskeletal problems referred to physical therapy. The spine sub-group had 354 patients. There was no single traumatic event in 87.7 % of the neck and back pain patients. Interestingly, there was no significant difference between the work-related and not work-related groups. No wonder safety programs frequently fail to reduce the incidence of back and neck pain in industry. The programs need to be oriented more towards lifestyle education and training.

Consequently, a prevention oriented treatment approach must address the biomechanical habits of individual and their physical ability to meet the physical demands of their lifestyle (work, home and play) to address root-causes. The approach needs to be objective, and achieve control over the relevant symptoms and signs so that they no longer interfere with the individual's ADL. Treatment procedures that can be incorporated into a lifestyle have a chance of achieving a long-term, preventative effect.

Next, let us look at the consequences of experiencing a back or neck pain episode. Allan and Waddell have shown evidence that the incidence and natural history of low back pain is essentially the same today as it was in the days of Hippocrates. Acute LBP was amenable to treatment such as traction, extension or rotation manipulation (prone or side-lying), and steam bath with or without mild electrical current (electric eels or fish). When the predominant symptoms are severe radiation from the buttock/hip down the leg, the problem tends to be more persistent and less amenable to manual treatment. Neck pain and cervical radicular disorders have a similar epidemiology.

This sounds very familiar, and is consistent with our outcome data and most research findings. The Quebec Task force distinguished these groups of patients based upon location of symptoms, and the presence (or absence) of neurologic signs because of the clinical relevance. The differences in these patients and their response to treatment can be neatly explained pathoanatomically. But, do these pathoanatomic answers enable us to understand why the incidence of chronic back and neck pain disability has continuously risen over the past 40 years? The answer to this is clear, and one of the reasons for the evolution of the bio-psycho-social model.

According to many authors, the major difference with the modern management of spine pain disorders is the psychosocial context in which treatment is delivered and the care is received. The common backache or stiff neck episode now has the potential to become a disabling event in an individual's life that merits compensation. Over the past 40 years LBP has become the number one cause for disability affecting individuals of working age. This trend continues to increase, even though it has been recognized for decades now. LBP is clearly the most expensive work-related musculoskeletal disorder, a dubious distinction that is challenged only by chronic cervico-brachial syndromes.

A small number of the cases (+/- 10%) represent the majority (+/- 90%) of the costs. These are the patients that have become disabled as a result of the onset of their back or neck pain. Psychosocial factors are currently the most reliable predictors of response to treatment and development of disability. When developing a model for prevention of spine pain disorders we

must consider these issues. We must recognize the differences between illness and disease, impairment and disability, and pain and function. We need to embrace a bio-psycho-social approach. But, this does not mean we discard our pathoanatomic models and our biomechanical tools. We need to strive to integrate our tools and skills into a more comprehensive and applicable package.

There is no doubt that spinal manipulative technique can provide a transient and frequently dramatic benefit to the patient. But, SMT does not inherently address the biomechanical use patterns that led to the onset of the episode. SMT does not address the lifestyle habits that affect the individual's ability to remain active and healthy during the process of aging. SMT does not necessarily lead to a restoration of activity-tolerance unless applied within the context of a functional paradigm.

These are much broader, more complex and (ultimately) more important issues. SMT must be connected to a system that helps the individual to understand, and control their biomechanical health. Development of the physical, mental and emotional ability to meet the physical demands of a lifestyle (work, home, and play) with a margin of safety is essential for prevention. SMT can be a tool that encourages this, but it cannot be the sole tool to achieve this.

The next issue I want to address concerns the effect that the caregiver can have upon the care receiver. This influence upon the attitude, beliefs and behavior of the patient can be profound. Low back and neck pain disability can be, and too frequently is induced iatrogenically. A biomechanical approach to the treatment and prevention of injury cannot control the individual's attitude, motivation, belief, fears etc. These psychosocial factors are the strongest predictors of response to treatment and potential for disability. How an individual responds to an injury, disorder or diagnosis has the greatest impact on their long-term function and the consequence of their episode. The attitudes, beliefs and communications of the caregiver can have a strong influence on the individual's response to the spine pain episode.

Limitations in the medical model to deliver effective healthcare for lifestyle (and degenerative) induced disorders was the prime reason for the evolution of the bio-psycho-social approach. This new model was first proposed by Engle and then popularized for LBP management by Waddell. SMT must be delivered with a strong consideration for these issues. If not, an otherwise effective treatment can become a catalyst for chronic pain and disability.

Conventional SMT systems rely upon accurate pain reporting by the patient. The increase and decrease of symptoms is interpreted to be reflective of physical and/or physiological changes in the underlying biomechanical lesion. But, what happens when the pain reporting is disproportionate to any relevant clinical signs? Or, the symptom and sign response to examination is inconsistent or unreliable? This is where the zealous practitioner can feed into the problem, rather than solve it. This is especially true when the patient reports symptom relief with SMT, but does not return to work or their normal level of activity as a result of the treatment. And, the same treatment is rendered over and over again without improvement in function. This is not effective treatment, and it encourages or reinforces inappropriate illness behavior.

So, the final question is; ‘who has the ultimate control over musculoskeletal health and wellness?’ Each individual does! Self-efficacy; according to Bandura is ‘ the exercise of control ‘. As physical therapists we are ideally suited to help individuals achieve musculoskeletal self-efficacy. However, we must take our skills and influence and move them into arenas for prevention. This includes taking our programs to industry, to the public, in to the school systems etc. But, the bottom-line is that the individual is responsible for the maintenance and service of their physical abilities.

The Duffy-Rath System© for injury prevention at work recognizes three stages in the development of CTD/RSI disorders: 1) warning signal stage, 2) non-specific disorder stage and 3) structural pathology stage. We integrate concepts of SMT into training for self-efficacy. The individual is taught to assess the health of their spinal motion (intra and extra-segmental) using principles of manual therapy assessment. SMT procedures are converted into self-treatment procedures to fight the warning signals of a pending disorder, or to initiate early intervention with an acute episode. These ‘tools to fight back ‘(TTFB) are connected to the use of effective body mechanics, what we have termed ‘protective work (play) habits’. Ultimately, they are connected to strategic strength and conditioning exercises. All of these tools are designed to meet the individual physical demands of daily function (home, work and play) with a margin of safety. This is an ongoing process, required through the course of a lifetime. It is our premise that (by definition) services that are preventative in nature are true healthcare. Treatment services are provided after a disorder, injury or disease has occurred, and is consequently illness-care.

Jean Duffy Rath, PT, Dip MDT is the director for prevention services for our private practice. The majority of our services are provided at the worksite, while the employee is working. This service is provided at multiple sites across the country for Carrier Corporation, with plans for national and international expansion. In 2000, at three of the industrial sites there were 2,125 cases of employees with warning signals of a potential CTD/RSI. There was an excellent to good response to the intervention in 80 – 90 % of the cases. As a result there was a significant reduction in recorded injury, time loss incidents and worker’s compensation costs. This program has won a UTC/Carrier ‘Best Practice’ award, the best Poster Presentation at the 2000 EH&S Technical Conference, and contributed to the UTC ‘Continuous Improvement – Health and Safety Award’ for the Carrier Caryle Compressor division in 2000. A leading OSHA legal consultant was hired to scrutinize the program, concluding that the approach was preventative, and not treatment.

To summarize, SMT is an important physical therapy tool to fight back against activity-related disorders of the spine. However, this tool cannot directly address many of the issues of activity-tolerance and function that are the ultimate goals for musculoskeletal healthcare intervention. I encourage the manual therapist to integrate their skills and experience with SMT into a system that facilitates physical demand ability. When SMT is indicated and successful, utilize the improvements in pain and movement to promote the acquisition of the strength, conditioning and attitude required for musculoskeletal self-efficacy. Whenever possible, convert techniques that you perform upon the patient into procedures the patient can do for themselves. Always customize what you do to the needs and lifestyle of each individual patient or client. Place the patient’s needs and concerns first, and do what is required to service them to the best of your

ability. Standardize and objectify your clinical process and documentation so that you can provide ongoing assessment of outcomes, and perform meaningful utilization review. Remember that patient service is what clinical practice is all about.

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DISCLOSURE:

Mr. Rath is President of HMW, Inc., a for profit service corporation that provides educational services and products pertaining to the Duffy-Rath System©.

Mr. Rath is developer of the Rath Mechanical Treatment Table, manufactured and marked by Hill Laboratories, 3 Bacton Hill Road, Frazer, PA 19355, (610) 644 – 2867.

Mr. Rath is developer of the Lateral Compartment Roll, manufactured and marketed by OPTP, 3700 Anaplois Lane Suite 175 PO Box 47009 Minneapolis, MN 55447-0009, 800 367 – 7393.