JOURNAL OF THE AMERICAN MANUAL MEDICINE ASSOCIATION

The Professional Journal of Advanced and Postgraduate Medical Massage and Medical Manual Therapy

Member Research and Article Issue

Medical Massage Therapy

Spring 2006

AHS™ PUBLICATIONS

Published Bi-Annually

www.emericanmanualmedicine.com

The Journal of American Manual Medicine Association was created to serve as a rational scientific voice for the medical massage and medical manual therapy community. The AMMA Journal is peer reviewed scientific publication. Articles and papers that are published in the AMMA Journal are presented in three main subject groups, editorial opinion, and scientific research, and legal, regulatory, and political events that pertain the medical massage and medical manual therapy professions.

Articles and papers written by outside contributors to the AMMA Journal do not necessarily reflect the view or position of the American Manual Medicine Association.

A PUBLICATION OF AMERICAN HEALTH SOURCE

Medical Publishing Pavilion
Suite 190
6475 28th Street SE
Grand Rapids, Michigan
49546

Phone: 888-375-7245

AMMA Advisory Board Members

Editorial Staff

***AHS*Publications**

From the editor...

Dr. Gregory T. Lawton

Dear AMMA Member:

In this issue you will find articles and research papers that have been submitted by the AMMA membership. The purpose of this issue is to provide our members with an "inclusionary" experience and the ability to contribute directly to their professional journal, JAMMA.

There is a noticeable lack of quality research and articles prepared and written by massage and manual therapists. One of the avowed purposes of JAMMA is to remedy this deficiency by giving our medical massage and medical manual therapy members a voice. This issue is dedicated to our members who have prepared papers related to the study and practice of medical massage and medical manual therapy.

This issue is also, in a sense, a celebration of our associations diversity of interests and expression of opinions. Through these articles and papers the contributing AMMA members demonstrate that we are indeed an organization of varied backgrounds and a broad membership base.

As a member of the AMMA you have completed a concentrated program of study in medical massage, passed the most difficult national board exam in the profession, and you stand at the highest pinnacle of the massage profession. To remain at the top you need to invest in your professional development on a daily basis. Since you are a medical massage therapist there is simply no limit to the knowledge that you need and can acquire that pertains to the conditions that you treat and the practice skills that you need to master. Your acquired knowledge and abilities pertain to being able to sort out the numerous false doctrines, pseudo scientific theories and fringe practices of your profession so that you do not commit the ethical errors of other massage therapists and so that you can select the most appropriate technique or treatment protocol for your patient.

One of the primary purposes of the American Medical Massage Association is to create a distinctive identity for our members through the actualization of the highest professional standards in the industry. Hopefully it is the members of the AMMA, through their professional conduct and high educational standards that will contribute to uplifting this noble profession.

Yours in good health,

Dr. Gregory T. Lawton

From the assistant editor

Dear AMMA Members,

I want to start off by stating that being asked to contribute to this journal was truly an honor, as well as also being a great undertaking. As the editor has mentioned in his address to you, the members of the AMMA, there is a lack of substantial contributions by the way of research by medical massage and manual therapists. Granted the primary function of a therapist is to treat, and the primary function of a researcher is to research. Even so, I encourage not falling into that mode of thinking, the two are not separate responsibilities. What inspires me the most is when I meet or see a therapist who exhibits the following traits. Curiosity (an under-rated attribute), hunger for knowledge, a desire to help others, and careful consideration and examination of truths.

It is important that we respect and understand the process in which we are attempting to discover the truth of the workings of the universe, as well as the workings of the human body. For as much as we know in this day and age, there is still a great deal that is a mystery to us. As our evolution of thinking and understanding expands we are able to find more conclusive truths, and this cycle continues, as long as mankind encourages it.

Our investigation is an essential part of our development as human beings. I ask you to read this journal, to seek, ponder, and to be inspired, and prompted to embark on your own journey of investigation.

Sincerely,

Timothy D. Parker CMT

TABLE OF CONTENTS

Page 6 - The Care and Maintenance of a Massage Therapist (AMMA)

Page 8 - The Amazing Similarity of Muscle and Catsup (Gregory T. Lawton DC)

Page 10 - Truthaches and Trigger Point Therapy (Gregory T. Lawton DC)

Page 12 - Fibromyalgia (Grace B. Hinkle CMT, RN)

Page 16 - Rheumatoid arthritis (Amy Dykema CMT, MA)

Page 20 - Plantar Fasciitis (Ben Pickel CMT)

Page 23 - Preoperative Knee Replacement (Kyle Clark CMT)

Page 26 - Scoliosis (Heather Powis CMT)

Page 31 - Low level laser therapy (World Association of Laser Therapy) (Article 1)

Page 33 - Low level laser therapy (World Association of Laser Therapy) (Article 2)

The Care and Maintenance of a Massage Therapist - or how much input and control regarding your profession do you really have?

The old adage that the only certainty in life is death and taxes should have this added to it, "and higher costs." It seems that everything is increasing in price. While we expect that better computers, entertainment equipment, cars and houses will cost us more, have you ever wondered why becoming a massage therapist, student loans, maintaining your national board certification, and state licensure, seems to take more and more money out of your pocket every month?

Consider the cost of getting a massage education. It wasn't that long ago that massage school tuition costs above the $10,000 level were unheard of. Now they are commonplace, especially in schools that have gone through the accreditation process and that provide access to federal student loans. Is there a relationship between a massage schools access to federal loans and increased tuition rates? There certainly seems to be.

The common thinking regarding accreditation is that it assures the appropriateness of massage training, while in reality the US Department of Education, which approves organizations like ABHES, ACCET and COMTA to accredit schools, clearly states that accreditation does not regulate the appropriateness of content, it rather audits and regulates school financial and administrative processes and it attempts to assure a basic level of quality. Nowhere does the USDE indicate that its methods assure the highest level of quality as has been claimed in the advertising of some accrediting agencies. Massage schools may teach anything from medical massage to healing with crystals. The appropriateness of subject matter based on validity or research is not a part of the accreditation process. The cost of maintaining accredited status increases tuition rates to students, but in some cases simply having accreditation results in school owners pricing their programs at a higher price.

National board certification with application, exam and renewal fees costs about $80 per year over a four year period. Not an outrageous amount of money until you begin to add in the cost of the required continuing education hours at about 12 hours per year for national board requirements, and that some states have higher annual requirements up to 16 or 18 hours per year. So what do those continuing education hours cost you? Well it averages out to about $18 to $20 per hour, but some approved providers cost, less and some cost more. This means that you spend another $240 per year for your continuing education requirements not including books, travel, meals, and hotel costs.

The best buy for continuing education is becoming the online or distance learning programs. Some of these CEU providers have lower costs to begin with, and you save time and money on meals, hotel, and travel expenses which could easily exceed the cost of the training.
Of course another cost is your state massage license. These costs vary among the 34 states that currently license massage therapy, but costs for a license and license renewal run from $50 to $150 per year, depending on what state you are practicing in.

There are other expenses that have to be added into to the cost of maintaining your licensure. For example, you may live in one of the states or areas that require that you belong to a massage association like the AMTA or the ABMP so you have to factor in your massage association

membership fees. Keep in mind that medical physicians, chiropractors, and other health care providers are not required to belong to a trade association. So you can add the annual cost or about $235 to your costs. (Don't forget the state chapter fee, about $30!)

There are states and local laws that say that you must have malpractice insurance and you have to maintain that insurance to get and keep your massage license. Like the state of Wisconsin law that states, "Has in effect malpractice liability insurance coverage in an amount that is not less than $1,000,000 per occurrence and $1,000,000 for all occurrences in one year." Of course, you would be out of your mind to practice without it, but you should have the right not to belong to an association and to shop wherever you want for your insurance.

So how does all of this add up? Well, depending on your state and your choice of continuing education providers, somewhere between $700 and $1000 per year.

Let's look at how all of this compares to other health care professions like physical and occupational therapy or chiropractic. The short version is that overall, these professions pay less for their licensure than you do as a massage therapist and they do so at a rate of about 5 to 20 percent depending on the state that they practice in. There are a number of states where massage therapist have to take more continuing education hours than a physical therapist such as Delaware where the state requires a PT to get 3 hours every two years and the massage technician must get 12 hours every two years, and massage therapists must get 24 hours every two years. A physical therapists national board exam costs $285. Most certifying organizations do not require repeated renewal, and thus there is no ongoing recertification fee. If we factor in recertification costs then massage therapy certification is one of the highest cost certifications that there is to maintain.

Chiropractors are another example; they complete a 4 part rigorous process of national board testing, and may choose from several elective testing areas such as physiotherapy and acupuncture. They pay a one time fee and have no "recertification" fee after that. Additionally, physical therapy, occupational therapy, chiropractic and most other national testing agencies for health care professions do not regulate continuing education; this is instead regulated by professional state boards and state licensure laws. When a massage testing agency regulates continuing education it simply creates its own industry, another layer of costs to the massage therapist, and a redundant activity and charge because states with massage laws and boards have their own continuing education requirements and accounting procedures anyway.

So what is the justification for having massage therapists pay as much as or more than other health care professions, such as physical therapy and chiropractic? Well it certainly is not based on numbers because there are a reported 150,000 massage therapists in the US, 160,000 physical therapists and 50,000 chiropractors. So arguments such as there are fewer massage therapists so we need to charge more to maintain their records won't work. It is not based on gross annual income because according to the US Department of Labor, Bureau of Labor Statistics physical therapists earn from $53,660 to $62,480, chiropractors earn from $44,140 to $102,400, and the median income for a massage therapist is $35,000. So what is the justification for charging a massage therapist more? It simply seems be inevitable, like death and taxes.

Authors Note:
This article has been written with information provided by the National Council of State Boards of Nursing, the American Physical Therapy Association, the National Board for Certification in Occupational Therapy, and the National Board of Chiropractic Examiners, as well as, from data supplied by the US Department of Labor, Bureau of Labor Statistics and the National Advisory Committee on Institutional Quality and Integrity.

The Amazing Similarity of Muscle and Catsup
Gregory T. Lawton, D.N., D.C., M.Ac. (Diplomat)

Some of the most recent advances in massage therapy have not occurred on the massage table but in the laboratory and amazingly they simply have to do with water and muscle cells. We can all remember the classes that we took in high school and massage classes on the biology of the cell where we first became acquainted with the cell as compared to a balloon full of water and various protein structures that made up the organs of the cell. This is what I call the fish in a Baggy approach to cell biology. Well if that is what you remember, you might as well forget it because most of what you learned about cell anatomy is wrong! But don't feel bad, most of the health care professions are lagging behind the science and even medical schools continue to teach outdated cell models and theories.

The new models of cell composition, structure and function, especially the new research on muscle cells, is very important to the massage therapist because the new models explain how massage affects the muscle and suggests more effective ways of treating muscle tension. Recent research suggests that cells are gels. One of the leaders in this research is Professor of Bioengineering at the University of Washington; Dr. Gerald Pollack. Dr. Pollack is an international leader in the field of cell function, specializing in muscle contraction and motility. Dr. Pollack's research suggests that cells are gels and that they behave like gels, including and especially muscle cells. Why is this research important to the massage therapist? Gels have special behavioral characteristics that cause them to stiffen (increased tension) with inactivity, and to soften or to become more fluid when various actions are directed at them. This characteristic is called thixotropy or the characteristic of a substance (muscle cell) to become more fluid when movement or activity is directed at it.

This is where we talk about Catsup. Catsup is a prime example of a gel that has thixotropic characteristics. How many of us have sat down to a delicious veggie burger and tried to drown it in a thick layer of organic Catsup only to find that the Catsup will not leave the bottle? Now let's compare the reluctant, stuck in the bottle, Catsup to tense and tight muscles. How are we going to get the Catsup out of the bottle? Well we are probably going to shake the bottle, bang it on the table a few times and then stick a butter knife in the bottle and stir the Catsup around. That usually does the trick with Catsup and it works for patients as well.

No, we are not suggesting that you shake your patients, bang them on the table, or use a butter knife on them. (Even though at times that might be tempting) This is simply an analogy that describes how muscle cells and tissues respond to the stimulus of massage techniques, movement or exercise.

When I am teaching classes in medical massage one of the questions that I pose to my students is, "when you palpate a muscle what are you feeling?" In other words what do you have in your hand? The simple answer is, "what is there." When you palpate a muscle in a relaxed state, as opposed to a muscle that is posturally contracted, what you are feeling is the bulk of the muscle, its tissue mass, and the various fluids in and around the muscle. If you have properly posturally positioned the muscle so that all postural contraction (eccentric) is removed and the muscle is in an inactive neurological state, then all that you are feeling is the mass of the tissue and its fluids. In the terminology of medical massage we call this neutral positioning of a muscle, postural folding. What we are actually palpating in the muscle is tissue density.

If, after we have posturally folded the muscle, the muscle is contacted and spastic, we are treating a patient who has an abnormal neurological condition, perhaps a post stroke patient. Understanding the gel like nature and behavior of muscle cells and tissue is an important concept for all massage therapists because it tells us one way that massage is able to change the stiffness or tension in muscles. Any massage technique that, in the analogy, of the Catsup bottle, compresses, stretches, shakes, twists (or in any variety of ways) moves muscle tissue, will result in a thixotropic response in the muscle (the muscle gets softer).

I probably should have mentioned that muscle cells get their gel qualities from water, specifically from the fourth phase of water. Water is present in the world around us as liquid (rivers), vapor (clouds), and solid, (ice cubes), but water also exists in a fourth phase which is the gel state. This gel state is also important in cellular metabolism and our discovery of this has completely changed our theories regarding how cells receive, create and move substances in and out of the cell.

A very exciting discovery regarding the fourth phase of water (gel) relates to its electrical conductivity. You are probably familiar with the use of conductive gels in medicine as mediums to conduct electrical impulses for ECG testing and electrical stimulation therapy. Gels are great conductors of electricity and the body uses them internally to move electrical impulses through and around tissues.

It appears that water in the gel state has an affinity for connective tissues like fascia, ligaments, and tendons and that the electrical impulses that are generated in connective tissues from movement is conducted through the gel, along lines of fascia for example, stimulates growth and repair activities of stem and cartilage cells, and promotes the formation of collagen. This discovery is now being applied to our understanding of how both massage therapy and acupuncture stimulate healing responses in connective tissues at the cellular level.
This has been an abbreviated, but hopefully helpful, review of how cell biology research is benefiting the field of massage therapy and how research can affect how we treat our patients. Research is a vital component of all massage, but it is essential to the practice of valid medical massage.

About the author:
Gregory T. Lawton, D.N., D.C., M.Ac (Diplomat) is the founder of and an instructor at the Blue Heron Academy of Healing Arts and Sciences located throughout Michigan and parts of Indiana.

References:
Cells, Gels and the Engines of Life: A New, Unifying Approach to Cell Function, Gerald Pollack, Ebner & Sons, Seattle, Washington
Medical Acupuncture, A Rational and Scientific Approach, Gregory T. Lawton, American Health Source Publishing, Grand Rapids, Michigan
Physics in biology: soft cells, Physical Review Letters 87, 148102 (13 September 2001)

Truthaches and Trigger Point Therapy

Gregory T. Lawton, D.N., D.C., M.Ac. (Diplomat)

No, this is not an article about dentistry and massage therapy, but it is an article about trigger point therapy that was triggered in part by an article that appeared in one of the "other" massage magazines that attempted to inaccurately explain trigger points. It is also an article about all of the past articles that have been written on the subject, those being written at this very moment, and those yet to be written. The point of the title is that truth hurts.
If you are in a hurry and want to save yourself the trouble of reading the rest of this article on trigger point therapy you can save yourself some time if you just read and agree with the following:

- Pain does not cure pain
- Trigger point theory is wrong
- Stop hurting your patients
- Stop hurting your hands
- Stop losing patients because of poor results and unnecessary pain
- Make more money by helping your patients and not hurting and losing them

The theory of trigger points has gone through several changes over the recent years from the original theory of Janet and Dave. Janet's original theory was that a trigger point was (you know this already) a palpable nodule or taut band of fibro-connective tissue in muscle. The problem with the original theory is that fifty five years later researchers and proponents of this concept are still attempting to find those little nodules and taut bands. There is, unfortunately, a lack of histological evidence that they actually exist which led most rational members of the research community to abandon that idea all together. Even Janet and Dave dropped the idea of applying ischemic compression on the trigger point and opted for cortisone and other "exciting" chemotherapeutic drug injections.

Over the years there have been numerous studies that have either attempted to prove or disprove trigger point theory. The Prover's have failed to prove their point (there is that pun again) and the Disprover's have made some significant discoveries that have turned the entire idea of trigger points on its head. One of the best rebuttals of trigger point theory and citations of the current literature in the field is the article by John L. Quinter and Milton L. Cohen entitled, "Referred Pain of Peripheral Nerve Origin, An Alternative to the "Myofascial Pain" Contruct". This is an excellent review of the historical development of trigger point theory and concepts and a step by step refutation of the theory along with some outstanding ideas about what this painful condition really is.

The supporters of trigger point theory and trigger point therapists cite research that has been discredited as either inaccurate, having technical procedural flaws, or that contains artifacts that have been caused by false positive readings in equipment such as electromyographic instruments (EMG). Needle biopsy of supposed trigger points identified by trigger point "experts" has consistently failed to show any difference between the muscle tissue within the borders of an "identified" trigger point and any other normal muscle tissue, so much for the idea of ischemic alternations in trigger point tissue.

So what is all this leading to? No one argues that there are areas "points" that generate pain. The question remains that if this is not muscle tissue pain, what kind of pain is it? Well this question led to the discovery that what had been erroneously labeled as trigger point pain and attributed to pathological changes in muscle tissue, is most likely (new theory) peripheral nerve pain at the motor end plate. This bears repeating so that this idea can replace all of the wrong information that you have been previously taught in massage school and seminars, and keeping reading about in massage magazines. This is where the story gets interesting for the massage therapist.
As a medical massage instructor I believe that it is important that the massage therapist knows the truth about the conditions they treat and the techniques that they use. Consider this. If trigger points are not a fibrotic alteration in muscle tissue then what is with all of this ischemic compression, deep tissue break down of adhesions, Knobbles, knuckles, rigid fingers, elbows and knees all about? If, as the current research strongly suggests, these pain sites are inflamed and abnormal nerve endings then what in the world are we doing poking things into excited painful nerves? Imagine that you have a painful tooth; do you want me to poke a fork into it? Does that sound therapeutic to you?

Of course there are massage students standing at massage tables at this very moment being taught to push their elbows into that "trigger point."

As a medical massage educator I have taught and written about the non physiological methods of massage therapy that are currently being taught to new massage students with wide open minds and expectations. What does non physiological mean? Simply that you are being taught something about a condition or the effects of a massage technique that is simply not true. This is also why there is a difference between medical massage instructors who teach non physiological theories and techniques and those that teach valid technique from the current research and scientific literature. As one of my teachers said to me years ago, "You teach what you are, you cannot give a gift that you do not possess and you cannot teach what you do not know."
It does not matter what a massage system is called, there are dozens and dozens of kinds and types of massage therapy and techniques. What matters is our understanding of body function based upon universal physiological principles and can our techniques effectively affect the body's natural corrective and restorative processes? From the example provided in this article it does not when our original theory is incorrect and that leads to unnecessarily causing increased pain and suffering in our patients.

Many massage schools that purport to teach effective massage techniques, the various groups and organizations that claim to follow the research literature are more interested in the number course hours in a massage program, than the quality of course content and have not even begun to address the task of validating massage techniques and procedures to assure their safety and

efficacy for patients. This is especially problematic when this kind of poor instruction is taught in a medical massage school or seminar because medical massage therapists unabashedly do claim to treat patient conditions.

If the truth hurts, that means that there was a problem to begin with.

About the author:
Gregory T. Lawton, D.N., D.C., M.Ac (Diplomat) is the founder of and an instructor at the Blue Heron Academy of Healing Arts and Sciences located throughout Michigan and parts of Indiana.

References:
Cells, Gels and the Engines of Life: A New, Unifying Approach to Cell Function, Gerald Pollack, Ebner & Sons, Seattle, Washington

Medical Acupuncture, A Rational and Scientific Approach, Gregory T. Lawton, American Health Source Publishing, Grand Rapids, Michigan

Physics in biology: soft cells, Physical Review Letters 87, 148102 (13 September 2001)

Fibromyalgia
Grace B. Hinkle CMT, RN

Fibromyalgia (FMS) is a disease of many symptoms. Not all of which are experienced by everyone who has the disorder. As many people as have the disorder, that's how many different combinations of symptoms and degrees of severity you will find. Its causes are not well defined. There are no specific blood tests, x-rays, or other diagnostics that say this is "Fibromyalgia". This leaves many physicians skeptical and patients frustrated. It makes treatment difficult because there aren't one or two or even ten steps that will consistently treat even two patients in a single physician's practice. These patients are often labeled "troublesome", "non-compliant" or "lazy"; most of which are none of the above. Patients are frustrated, in pain, often confused, and depressed. So, to get a better picture of the syndrome, the following is an overview of the disorder with special emphasis on the benefits massage therapy can have on these clients.

Symptoms: these are some of the most prevalent;

- Pain in 11 of the 18 tender points listed
- Non-restorative sleep; insomnia' tired even after sleep
- Aches and pains in joints and muscles that may travel from one site to another for greater than six months
- Autoimmune problems – diseases / disorders
- Itchy skin, burning sensations
- Headaches
- Humps and bumps in musculature
- TMV dysfunction
- Weakness, tiredness, overwhelming fatigue
- Depression

- Chronic bowel problems; cyclic constipation / diarrhea syndrome, Chrones disease, IBS
- Hypoglycemia
- Food allergies: wheat; dairy, especially
- Electrolyte imbalances, especially calcium, magnesium and phosphorus
- Loss of motivation and creative drive.

Diagnosis

This is a very difficult syndrome to diagnose because there aren't any specific blood tests, x-rays, scans, or scopes that point to a specific diagnosis of FMS. By ruling out other syndromes and looking at the composite group of symptoms, the diagnosis is made. Therefore, it is essential that the clinician take a detailed medical history, listen-ing carefully to the patient to detect clues. It is also thought by some, that certain events in the patient's life may precipitate or intensify symptoms: events such as

- Onset of autoimmune disease
- Major trauma or auto accident
- Major life change, such as divorce
- Loss of significant family member
- Imposed life style change or job change

One of the things that makes diagnosis difficult is the fact that each patient has a different combination of symptoms and to widely varying degrees of severity. It is not uncommon for patients to have been to several doctors before a correct diagnosis is made. Many times, these patients are viewed as "problem patients" because they have lots of symptoms but no diagnostics that point to anything. In fact, everything looks great. FMS has been dubbed the "Invisible disease" 1, because of the lack of provable symptoms. Because of this, there are still physicians who refuse to acknowledge the validity of this disease.

It would seem that more women have this disease than men. However, many men who have these symptoms do not seek medical help since these symptoms tend to be opposed to a "macho" image they feel they must maintain. Many patients get side tracked in a specialist's office because the presenting problem is being treated as an isolated issue rather than as part of a much larger disease process.

Prognosis

The good news is – this is not a life threatening disease. In and of itself, it will not cause anyone's death. The sad news is – life is miserable, painful, depressing and many feel, not worth living on that level.

The good news is – there's a large quantity of information to help patients and physicians devise a workable treatment plan. There are many support groups available to encourage and uphold people with this disease. There is a wealth of practical, updated information on the Internet, free for the taking. The downside is – patients with FMS may be and should eventually be as well-educated or better educated than their physicians. Why? Because there are still a group of doctors

out there who refuse to accept FMS as a legitimate diagnosis. In addition, research is constantly redefining and refining the options available for treatment. The commonly asked question, "Will I ever get better?" has a two-fold answer. First, right now there is no known cure for Fibromyalgia. Second, symptoms can improve. "The prognosis for stabilization or improvement in most people over time is good…" states Dr. Mark Pellegrino. Those who do better are more likely to display these traits:

- Early diagnosis following symptom onset
- Diagnosis at a younger age
- Successful response to treatment
- Fewer associated conditions
- Flexibility in job situations
- Follow-through with a home program

Treatment

As a Physiatrist, Dr. Pellegrino sees hundreds of patients with pain and he suggests three primary goals of treatment:

1. Decrease the pain, even if it's still present
2. Improve function
3. Learn to implement a self management program

Interestingly enough, he views massage therapy and exercise, not as alternative options, but as integral parts of a treatment plan. Medications such as analgesics, anti-inflammatory drugs, anti-depressants, sleep modifiers, and antibiotics can assist in meeting treatment goals.

There are controversial treatment options such as the use of guaifenesin as proposed by Dr. R. Paul St. Amand. His plan is very restrictive and patients need a high level of commitment and motivation to follow through with his plan.

Each person with Fibromyalgia eventually must take the bull by the horns and decide to find out what works for them. This is very much a trial and error process. Because each person's symptoms vary so much, this process can look vastly different for each patient.

Massage Therapy: what can massage therapy and the modalities offer to patients with Fibromyalgia? It can:

- Decrease pain by relaxing muscles
- Stimulate circulation and thereby bring more fluids and oxygen to tissues
- Facilitate removal of cellular waste products
- Increase ROM and re-educate muscles
- Passively, or with patient assist, stretch muscles and joints to reduce stiffness and pain
- Enhance relaxation, pain relief and reduce stress through any of the modalities
- Increased circulation and fluid movement in treated area

The success of any of these goals depends on how personally involved each patient is willing to become in their own care. Massage therapy will not cure Fibromyalgia, but it can greatly reduce pain and inflammation, increase joint flexibility and improve over-all feelings of well-being and inspire hope.

As part of the treatment plan, areas that need to be addressed are:

- How to get a good night's sleep, one that provides restoration
- Managing the constant horrible fatigue
- What can one do about Fibromyalgia, i.e. forgetfulness, concentration difficulties, confusion, short-term memory loss, difficulty with saying or finding words
- What options will work best for irritable bowel and bladder problems.

This list just scratches the surface of the many problems that must be dealt with daily.

Nutrition

Nutritional deficiencies are common in persons with Fibromyalgia. Here are a few of them and some suggestions for supplementation.

- Serotonin deficiency causes depression, fatigue, increased pain and hypoglycemia. 5-HTP helps the body produce serotonin, suppresses appetite and helps induce sleep. A typical dose is 100 – 300 mg per day. 2
- Magnesium deficiency tends to be worse in Fibromyalgia patients and interferes with the muscles' ability to relax and make energy. Anywhere from 300 – 500 mg of extra magnesium supplement in the form of magnesium glycinate may be needed.
- Low ATP or energy molecules are common in patients with Fibromyalgia. This lower concentration is probably due to poor metabolism of nutrients and contributes to fatigue, increased pain and increased muscle spasms. A vital enzyme in the energy producing pathway of the mitochondria is co-enzyme Q10. Generally CoQ10 dosing is 100 – 300 mg daily.
- Low growth hormone levels have been found in people with Fibromyalgia and cause such symptoms as fatigue, increased fibrofog, decreased metabolism and depressed immune system. Bovine colostrum given orally has been found to raise a derivative of growth hormone thereby improving energy levels and improving concentration. 3

Dietary improvement will help patients feel and function better even if changes are small. Some patients need to go so far as to identify food allergies and omit these from their diet altogether. The most offending items are wheat products, dairy, red meats, and trans fats. Other food products which should be greatly reduced are sugars, white rice, alcohol, and carbonated beverages. Each patient must decide what will benefit him /her the most.

The approach to helping patients with Fibromyalgia lead a full productive life is obviously a multi-disciplinary project in which massage therapy can have a major role. Patients must decide which therapies and modalities will benefit them most. They must decide how committed they

will be to follow the suggestions made by therapists for self care. These are the areas that will make the most difference for the patient's improvement.

Endnotes

1. Berne, Chronic Fatigue Syndrome, Fibromyalgia and Other Invisible Illnesses, p. 27
2. Pellegrino, Fibromyalgia: Up Close and Personal, p. 147
3. Pellegrino, ibid, p. 149

Bibliography

Balch, James F. and Phyllis A. Balch, Prescription for Nutritional Healing, Second Edition, Avery Publishing Group, 1997

Berne, Katrina Ph.D, Chronic Fatigue Syndrome, Fibromyalgia and Other Invisible Illnesses: The Comprehensive Guide, 3rd edition, revised, Hunter House, 2002

Pellegrino, Mark J., Fibromyalgia: Up Close and Personal, Anadem Publishing Inc., 2005

St. Amand, R. Paul and Claudia Craig Marek, What Your Doctor May Not Tell You about Fibromyalgia, Warner Books, 1999

Starlanyl, Devin, and Mary Ellen Copeland, Fibromyalgia and Chronic Myofascial Pain Syndrome, Harbinger Publications Inc., 1996

Rheumatoid Arthritis and the Effects of Manual Therapy

Amy Dykema CMT, MA

Chronic pain, stiffness, joint aches, fatigue and even depression are all results of rheumatoid arthritis. Rheumatoid arthritis is a debilitating disease affecting many people. The following will explain the common signs, symptoms, and medical management as well as alternative therapies that will aid in the help and support of someone suffering from RA. Manual therapy techniques applied will prove to be beneficial for people living RA and will improve their overall health maintenance. As a manual therapist, if ones pain is controlled, their quality of life is improved. Though RA cannot be cured, it may be controlled to a certain degree.

Rheumatoid arthritis is an inflammatory process that affects different joints in the body. It is a systemic problem. The joints that are typically affected by RA are the jaw, neck, sternoclavicular joints, shoulders, elbow, hips, wrists, fingers, knees, ankles, and feet. If differs from osteoarthritis in that OA commonly affects the neck, lower back, hips, base of the thumbs, fingers knees and toes. This disease affects approximately 2.1 million people or about 1% of the American population. Etiology of the disease is unknown. Women seem more prone to the disease than men, though the reason is unclear. The female to male ratio tends to be 3:1. It does not appear to be genetic in nature, though it is still being studied. Other associated factors that may play a role in RA are viral infection, psychological stress, immune response and hormone

interaction. Onset typically occurs between age 25 and 50, but there are cases of juvenile RA, which occur in children that are categorized by their age being less than 16 years of age.

RA is considered an autoimmune disorder in that the immune system attacks a specific protein. The problem lies in that the protein is not on a microbe, but it is located in the synovial membranes or synovium. The synovium will congeal and enlarge, thus causing fluid to fill inside the joint capsule, which produces pain and pressure. Inflammation of the joint occurs. After time, the process can cause deformation of the joint capsules and the joint itself. It is uncertain what triggers the inflammatory process. It is thought that a foreign substance or antigen or a virus could be a trigger.

Qualifying criteria for RA as established by the American Rheumatism Association are as follows: Positive serum rheumatoid factor (RF), morning stiffness lasting longer than 1 hour, arthritis of the hand, with particular involvement of the PIP, MCP, or wrist joints, rheumatoid nodules, X-Ray evidence of RA, bilateral involvement of joint areas and arthritis involving 3 or more joints. There are also other contributing symptoms or history including a feeling of malaise or a feeling of illness, low-grade fever, weight loss, myalgias, weakness, bursitis and/or tendonitis. About 25% of people with RA develop rheumatoid nodules. These are small lumps of tissue under the skin. They range in size, from the size of a pea, to a large nut. Typically, they are not painful, and tend to form under the skin of the feet and heels, over the knee, the back of the scalp, the hands and on the elbow.

Diagnosing RA proves to be difficult. The physician should first look at patients' clinical history, then do a physical exam. From there, diagnostic testing may be done. There are specific blood tests to test for RA. Rheumatoid Factor (RF) and a sed rate or ESR (Erythrocyte sedimentation rate) is the two most common. Another serum test often done is C reactive protein (CRP). Both ESR and CRP are very good indicators of inflammation going on throughout the body. Physicians will look at both an ESR and a CRP results to get a better idea of the degree of inflammation. In addition to these blood tests, a complete blood count and antinuclear antibodies (ANA) tests may be included. In approximately 80% of patients diagnosed with RA there is the presence of anemia in their blood. Thrombocytosis may be present as well. It should be noted that one could have a normal RF and still have RA. Other diagnostic testing includes synovial fluid studies, x-rays, CT scans, MRI, biopsies and HLA-DR4 and DR-1 (specific genetic markers).

There is a large array of differential diagnosis for RA; the following are a small list of those: temporomandibular joint syndrome, tendonitis, tenosynovitis, lupus, reiter syndrome, sarcoidosis, polymyositis, myopathies, myocarditis, inflammatory bowel disease, amyloidosis, viral arthritis, whipple disease, and osteoarthritis (erosive). This is why a comprehensive physical exam along with lab studies should be performed prior to diagnosis. Without using these valuable tools, RA may go undiagnosed, or misdiagnosed.

It is important for a person who is diagnosed with RA to have a supportive panel of medical professionals who are willing to work within a large scope of different practices for the best outcome. By this, I mean work from both a medical aspect and alternative therapies to achieve

the greatest response to the patient. Medical and manual massage will play a great role in the quality of life a person with RA may have.

From a medical standpoint, they will first start with medications to aid in the inflammatory process. Typically, a physician will start with NSAIDS (nonsteroidal anti-inflammatory drugs). NSAIDs help in pain reduction, stiffness in the joints and swelling, they limit the production of prostaglandins, which tend to be inflammatory. They are used because of their tendency to work rapidly. Even thought they are very effective in controlling the symptoms of RA, they do not change the course of the disease process.

The most common NSAID taken is motrin, and though it tends to give adequate relief, the side effects can be damaging. A major side effect and the most common of not only motrin, but also several NSAIDs is stomach upset. When taken for extended periods gastritis or stomach ulcers can occur. Thus, the patient will need to discontinue the use of these medications. If people were considered high risk for stomach upset of GI bleed, a COX-2 inhibitor would be tried next. A COX-2 inhibitor is still a form of an NSAID, but it tends to be easier on the digestive system. Typical drugs prescribed are celebrex, and bextra. Vioxx had previously been prescribed until a study showed an increased risk of serious cardiovascular events.

From a medical standpoint, the next step is to prescribe a drug that will interrupt the disease process. These types of drugs are called DMARDS or disease- modifying antirheumatic drugs. This is to help control the arthritis process and to prevent damage to the joints. Some researchers say that these drugs aid in slowing the process of RA, but there is no conclusive evidence. Unfortunately, DMARDS is not a fast acting pain reliever, thought it seems to aid in the improvement of comfort felt by the RA patient in long-term use.

There are characteristically two groups of DMARDS used by physicians. Nonimmunosuppressants such as injectable gold, ridaura, plaquenil (which is also an antimalaria drug) curimine, azulfidine, arava, and minocin. Plaquenil is the most frequently prescribed secondary to the minimum amount of side effects. Though people who take plaquenil need eye exams every 6 months to check for retinopathy. The second group is the immunosuppressant drugs such like methotrexate, imuran, cytoxan, and cyclosproine. It is very common that rheumatologists need to prescribe a combination drug therapy as well as other alternative therapies.

Yet another type of medication used in the arena of RA is biologic response modifiers or BRMs. Because RA is such a complex disease process scientists are discovering significant changes that occur in the immune system in people with RA. There are two major cytokines that deliver the message of inflammation; they are tumor necrosis factor (TNF) and interleukin-1 (IL-1). Because these cytokines tend to be abnormally high in RA patients, a BRM is given to help balance them out, thus creating less inflammation and pain. Common BRMs prescribed are enbrel, remicade, humira, and kineret.

The last type of medication used in conjunction with RA is corticosteroids. These are used because they resemble the body's own innate chemical makeup of hormones. In general, corticosteroids work quickly and patients obtain great relief. One reason the relief is quick is

that it is typically injected into the joint where the greatest pain is occurring. Due to the enormity of the side effects that corticosteroids pose, this is used as a last resort, or in conjunction with a combination of medications. It should be noted that it be taken in minimum doses and observed closely by a physician. Corticosteroids should not be taken for long periods of time; again because of the side effects. Side effects are as follows, but not limited to: mood swings, nausea, fluid retention, puffiness, facial hair growth, weight gain, acne, high blood pressure, osteoporosis, muscle weakness, eye problems, hormonal problems, menstrual irregularities, higher risk for infection.

An additional aspect that facilitates with RA is diet. Although there is no proven diet that can halt the progression of RA, it is indicative to alleviating some of the pain and inflammation caused by RA. A diet that is high in omega 3 and omega 6 fatty acids have proven to be beneficial. Increasing the amount of omega 3 and omega 6 fatty acids as well as adding glucosamine sulfate and chondroitin sulfate to supplement their diet will aid in the joint repair process. There are other studies that object to these finding, and feel that while glucosamine and chondroitin help with osteoarthritis, it is not conclusive in helping with the condition of RA.

A person with RA should consult a nutritionist or dietitian to find the best diet for them. They may find some foods prove to enhance their pain, while increasing others may alleviate their pain. There are current studies going on that are researching the effects of fish oil and RA. What they are finding is that increasing omega-3 fatty acids in fish oil can reduce the swelling and pain in RA.

Manual therapy is up and coming in tackling the disease of RA. Although manual therapy will not cure RA, it will benefit those patients significantly. Massage is one of the most common practices in alleviating pain and tension. Because massage and manual therapy increases circulation and decreased inflammation it is vast in the prevention of RA flares. Physicians are beginning to see the correlation between massage and pain relief and some insurance companies are starting to pay for this type of therapy.

Manual therapy should not be used during an acute flare, but used as a preventative method during the sub acute phase. Manual therapy can aid in increasing range of motion and preserve the health of the joint. It is also thought that if the autonomic nervous system is kept in balance it may help to lessen the frequency of RA attacks. One cannot stress enough the benefits that manual therapy may have on a patient with RA if they receive regular treatments. Preventative health is often used in the medical society and manual therapy is enormous in this area, not only for RA, but for many other health problems as well.

Bibliography

Berger, Margeret, Nutritionist, PermaHealth, Inc., www.authenticcmo.com/arthritis_studies

King, MD, Randall, Assistant Clinical Professor of Emergency Medicine, Medical College of Ohio Program Director, St Vincent Mercy Medical Center, www.emedicine.com/emerg/topic48.html

Shlotzhauer,MD, Tammi L. and McGuire, MD, James L. Living With Rheumatoid Arthritis, The Johns Hopkins University Press, 2003.

Unknown, www.nationalarthritis.com/rheumatoidarthritis.htm

Werner, Ruth A Masssage Therapist's Guide to Pathology, Lipincott Williams and Wilkins, 2005

Plantar Fasciitis
Ben Pickel CMT

Plantar Fasciitis is a condition which affects many people especially athletes, but this condition does not need to sideline you from your exercise routine. Rest is always recommended to overcome most exercise related injuries. I believe with a comprehensive treatment plan you will be able to maintain your level of fitness and at the same time recover fully from Plantar Fasciitis.

Plantar Fasciitis is considered a chronic inflammatory syndrome rather then a post-traumatic disorder. It is an overuse injury affecting the sole or flexor (plantar) surface of the foot. A diagnosis of Plantar Fasciitis means that you have inflamed the tough, fibrous band of tissue (fascia) connecting your heel bone to the base of your toes. The plantar fascia provides support for the medial longitudinal arch of the foot after a heel strike, at the beginning of the stance phase of the gait cycle, the tibia rotates internally and the foot pronates, stretching the plantar fascia as the foot flattens. Since the fascia has no elastic properties, repetitive stretching results in microtears at its origin. You are more likely to develop this condition if you're a woman, if you're overweight (85% of people with plantar Fasciitis are over their ideal weight), or if you have a job that requires a lot of walking or standing on hard surfaces. You're also at risk if you run for exercise or have tight calf muscles that limit how far you can flex your ankles. People with very flat feet or very high arches are also at risk for Plantar Fasciitis.

The Condition starts gradually with mild pain at the heel bone often referred to as a stone bruise. You're more likely to feel it after (not during) exercise. The pain classically occurs again after arising from a mid day lunch break. The pain will be most prevalent in the morning, right after getting out of bed because during the night the foot rests in plantar flexion, allowing the fascia to contract. With the first dorsiflexion steps of the day the fascia is stretched, causing pain.

Biopsy of the inflamed fascial area reveals fibroblastic proliferation and chronic granulomatous tissue, with thickening of the fascia from a normal 3.0mm to as much as 15mm. As the tight fascia is pulled and torn away from the tuberosity, calcium is deposited and a bone spur may form on the inferior calcanous. The bone spur itself is not the cause of pain, the chronic inflammation of the torn fascia causes the pain. Half of patients with plantar Fasciitis have spurs; however bone spurs may exist with out plantar Fasciitis being present.

Frequency:

In the United States eleven percent of the population has bone spurs. However, a bone spur does not necessary indicate plantar Fasciitis. Bilateral symptoms occur in 20-30% of patients

with plantar fasciitis. It is more common among middle aged women and young male runners. Obesity is present in 90% of female cases and 40% of males. Age has no factor on who may develop the condition. However, it is rare for someone under the age of 25 to have plantar fasciitis.

Physical:

The pain is dull and is similar to that of a toothache. No tenderness should be present with medial to lateral heel compression. A finding of tenderness is suggestive of a stress fracture. Findings at a physical examination would include:
Flat foot, highly arched foot, or excessively pronated foot.

Gait alteration (supination of foot to redistribute the load laterally or toe walking to avoid pressure on the heel.

- Tenderness of heel with dorsiflexion of the foot or great toe that resolves with plantar flexion of the foot, which relaxes the fascia.
- Decreased dorsiflexion of great toe
- Decreased dorsiflexion of ankle (<90 degrees)
- Possible small granuloma palpable along the medial fascial origin
- Mild edema

Causes:

- Obesity or sudden weight gain
- Tight Achilles tendon
- Change in walking or running habits
- Use of shoes with poor cushioning
- Change in running or walking surface
- Occupation with prolonged weight bearing (policeman's heel)
- Excessive pronation

There are many options available for treating plantar fasciitis; here are some of the most common:

Rest is the first treatment for plantar fasciitis. Most doctors will advise you to keep weight off your foot until the inflammation goes away. You can also apply Ice to the sore area for 20 minutes three or four times a day to relieve symptoms. Often a doctor will prescribe nonsteroidal anti-inflammatory medication such as Ibuprofen. A self care program of exercises designed to stretch your Achilles tendon and plantar fascia are a mainstay of treating the condition and lessening the chances of recurrence.

Sit on the floor with your legs stretched out in front of you. Loop a towel around the top of your injured foot. Slowly pull the towel towards you, keeping your body straight. Hold for 15-30 seconds, repeat 10 times.

Stand facing a wall; place your hands on the wall chest high. Move the injured heel back and with the foot flat on the floor move the other leg forward and slowly lean toward the wall until you feel a stretch through the calf, hold and repeat.

Stand on a step on the ball of your feet, hold the rail for balance. Slowly lower the heel of the injured foot to stretch the arch of your foot.

Further Outpatient Care:

- Avoid activities that irritate the condition and avoid walking barefoot
- Lose weight
- Tape the heel and arch
- Wear running shoes or shoes with good support and cushion
- Use a soup can or something similar to massage the bottom of the foot
- Use night splints designed to keep the foot in slight dorsiflexion
- Treatment options for the Runner who doesn't stretch well, and won't stop running:
- Run on soft surfaces such as grass
- Alternate routine with cycling
- Ice, ice, and more ice
- Plantar Fasciitis night splints (Available at most running specialty stores)

In resistant or sever cases:

Below the knee walking cast (3-4 weeks)

Steroid injection (acute or sub acute phase), most doctors do not recommend injection for treatment unless all other possible treatments have been exhausted.

Plantar Fasciitis and the Massage Therapist:

Massage is indicated for plantar fasciitis. It can help release tension in deep calf muscles that put strain on the plantar fascia; it also can help to affect the development of scar tissue at the site of the tear. The most important thing to do for plantar fasciitis is to remove the tension that causes the plantar fascia to be reinjured every morning when the foot first hits the floor. Deep massage to the calf muscles and at the site of the tear are frequently prescribed for plantar fasciitis. As a therapist Cryo-therapy, Actino-therapy, and massage are your best options. Plantar fasciitis is a persistent injury which will need daily attention. Therapists should schedule their patients often and realize the process will take up to twelve weeks and sometimes even longer. The ultimate success in treating this condition lies in the hands of your patient and if they follow self-care instructions.

Foot Technique:

Client Supine. The therapist treats at foot of the treatment table facing the bottom of foot. Warm the area first by using superficial technique. Grasp client's toes and ball of foot with one hand and dorsiflex foot, stretching the plantar fascia. With the other hand use thumb or knuckle to

strip the plantar fascia from top to bottom covering all surface area. Always move top (ball of foot) to bottom (heel). Icing afterward will usually speed the healing process. Apply as much pressure as the client can stand. This is usually very painful. If the client can stand the pain, the condition will heal faster.

Bibliography

Massage Therapists Guide to Pathology	Pages 147-148
Runners World Magazine	March 2003 pages 73, 74
Journal of Medicine, Harvard Univ.	April 15, 1999 pages 59-58

Web References:

American Orthopedic Website www.orthoinfo.aaos.org

www.emedicine.com

Healthlink, Medical college of Wisconsin: www.healthlink.mcw.edu

Preoperative Knee Replacement and Manual Therapy

Kyle Clark CMT

Joint replacements have become common place in today's culture. Body parts wear out, work improperly and cause pain. Our society has accepted the "easy" way out and opted to resort to the easiest measure instead of the smartest. I'm not so sure they may even know about all of their options. Is this their fault or the fault of our health care system? Doctors often push their own agenda for personal gain and profit. In this paper we will look at all of the options that Americans have to address their issue of pain as they grow older. When manual therapy is appropriately applied, knee replacements can be delayed by years and in some cases may not be necessary at all.

Many different options exist for people that actually need them. Here is a summary of these operations:

Total knee replacement. In this operation the medial and lateral condyle and epicondyles are cut off, a hole is drilled in the long bones and a metal prosthesis is hammered and cemented into place. An ultra-high-molecular-weight-polyethelene piece acts as the meniscus. (totalkneeinfo.com) This is a radical operation because most of the musculature around the knee has to be cut and then re attached. This makes a weak spot that requires 6 to 18 months of rehab before normal life can resume.

"Unicondylar knee replacement" is a new less invasive procedure that has been invented (infobeagle.com). Most often the medial compartment of the knee deteriorates quicker than the lateral. Why take more than you have to? In this surgery only the medial condyle and

epicondyle are cut off and replaced. Although any bone surgery is radical, this one is far less invasive. All of the ligaments remain intact and the patient recovery time is much shorter due to the fact that less cutting has been done and far fewer muscles are compromised.

Patellar resurfacing is the least invasive procedure that I found. This is a treatment for patellar femoral syndrome. The posterior articular surface of the patella becomes rough so after cutting some of the posterior patella off, a plastic articulating surface is fitted and the joint is then closed up. Rehab after this surgery is short and most reported a great decrease in pain (vjortho.com)

While on line I found many, many sites that said that their product was the best for this reason or that reason. Here's a link to find a surgeon in your area that uses our products. What I didn't find were ANY links from these sites to other sites that would provide resources for alternative treatments or tips for reducing pain associated with arthritis. In my opinion this is just irresponsible and shows how greedy our health care system really is.

The life of a product like this depends on many factors. One is the quality of the prosthesis. Many of the sites out on the web claimed to have the best product on the market. This simply can't be true and the studies that they presented can be skewed to show what they want you to see. Another factor is your surgeon. It has been determined that if the prosthesis is not installed at the right angle, the neoprene articular surface will wear out prematurely. New technology has been developed for this purpose. A GPS of sorts has been introduced that would show the surgeon the perfect angle for the implant.

It is expected to be on the market within the next year (NBC Nightly News).
Knee replacements are 90% effective 15 years after the surgery but from there success of the implant varies radically. (totalkneeinfo.com) The weakest link in the whole unit is the articular surface (wmt.com). It is artificial; it does wear and leave small particulates floating in the joint. A condition can develop because of this called osteolysis which is bone wasting. When this happens the body attacks the foreign matter and the bone gets attacked at the same time. The bone eventually gets so weak that it can no longer hold onto or support the prosthesis and it may need to be removed. After this there is nothing that can be done and the bone must be fused together and the knee joint would then be immovable. Some people do lead great lives after knee replacement but enough stats have not been gathered to tell us the whole story.

Through the last year of treating patients with knee problems, I have personally treated a couple of patients that were told that a knee replacement was inevitable within the next couple of years. However, both of these patients are far too young to have the operation, so they came to me seeking alternative therapies that may prolong the length of time before needing a total knee replacement.

To get started we need to know why knee replacements are performed. 90% of all knee replacements are done due to arthritis. The other 10% are due to some other sort of trauma or degeneration (PDR Health). Arthritis is a progressive degenerative disease that can be split into two basic categories, Osteoarthritis and Rheumatoid Arthritis. Osteoarthritis is by far the most common type, affecting 20 million Americans (Pathology for Massage109-115). Osteoarthritis is usually due to some sort of micro or macro trauma. Each time a joint experiences a trauma;

degeneration occurs and accumulates adding to the degeneration of that joint. Cartilage is the buffer between two bones, it gets microscopic tears and becomes less springy and allows the bones to start rubbing on each other which makes movement painful. Rheumatoid arthritis is an autoimmune disease where the body attacks the joints and eats away at the auricular surfaces of all the joints. Any joint that has sustained prior damage will deteriorate quicker than those that are fully intact. Scientists are not yet sure what makes the body attack itself, consequently doctors currently treat RA and OA with NSAIDs and some times with steroidal anti-inflammatory drugs. This is quite curious due to the fact that steroids promote the hardening of tendons and ligaments and ultimately cause limited range of motion by varying degrees. The long and the short of why joint replacements are done is because joint degeneration makes movement more and more painful until movement is intolerable.

Arthritis costs Americans a lot of money each year. The average patient with OA makes 9 visits to the doctor each year that are OA related (bonesmart.com) Weight is a major factor when dealing with joint pain because the joints are subjected to more stress than it is designed to handle. Here are some OA statistics that will shed some light on the problem: In a study of patients that were diagnosed with OA:

- 51% decrease in number of active or very active people
- 56% of respondents gained an average of 42 lbs.
- 82% of these experienced negative self esteem (kneereplacement.com)

The extra stress of gaining weight is only compounding the problem; the key it would seem would be to keep active people active as long as possible. Without the weight these people would be able to move more to help retard the progression of this epidemic. The dollar amount is minimal compared to the mental toll that this disease takes on its victims. Each person sees themselves steadily declining and decreasing in their physical ability until they are just a mere shadow of their former selves which is probably the most costly of all.

When a person comes to a doctor with these types of conditions, they are often told that a joint replacement is inevitable. Telling them this plants a seed in the patients head that this is the end result so why not just do it to get rid of the pain now. Some physicians will take it a step further and actually give their patient a time line for their degeneration which sets the stage psychologically for their client to look for an increase in discomfort and pain. I found two clients that had been told some version of this scenario, and weren't sure if manual therapy could do anything for their pain because their physician had not even discussed it as an option.

The other 10% of knee replacement candidates are those who have sustained some sort of trauma. I am lucky enough to have one of them as a client. Client 1 sustained a fall which made an oblique tear in the medial meniscus of her right knee. Arthroscopic surgery was done to remove the part of the meniscus that was causing misalignment during weight bearing articulation. And the client did not even have physical therapy prescribed but was told that soon (within the next five years) she would need a total knee replacement.

Client #2 is a 55 year old real estate agent who loves to golf. He was in Vietnam during the war and sustained many traumas that he would not talk about (understandably). He also said that he

was repeatedly sprayed with Agent Orange and DDT which he says contributes to his arthritis and pain. He has been getting chondroitin injections in his right knee every 6 months for the last 18 months and says that it has been helping.

Being a manual therapist and hearing of these individuals my only option was to see what I could do for them. Inflammation is the main degenerative factor for joints and reduction of inflammation is our goal as a therapist. When any area of the body is inflamed, the muscles in that area will "splint" that area to protect it from further injury. This is ok when an injury first happens but, long term increased muscular tension causes further misalignment, discomfort and pain, ultimately propagating the tension and ischemia. So as a therapist I can relieve some of the muscle tension that surrounds the injured knee. This should provide some pain relief to the client.

Resources

www.totalkneeinfo.com	internet
www.infobeagle.com	internet
www.vjortho.com	internet
NBC Nightly News	Television 6pm Oct. 16th, 2005
www.wmt.com	internet
www.pdrhealth.com	internet
Pathology for Massage Therapists	written by Ruth Werner
Copyright 2005	Lippincott Williams & Wilkins
www.bonesmart.org	internet
www.kneereplacement.com	internet
www.webmd.com	internet
National Library of Medicine	internet

Scoliosis
Heather Powis CMT

Scoliosis affects approximately 2-3% of the population (about 6 million in the United States). (Massachusetts General Hospital Treadwell Library) It is a condition of the spine resulting in abnormal lateral curvature and vertebral rotation, which can be present in the thoracic spine, lumbar spine, or both areas at the same time. These curves are characterized by either a C-shape or S-shape. The abnormal curvature can range in size from as minor as 10 degrees to severe cases of more than 100 degrees. (Spine School) The cause of scoliosis is idiopathic or unknown, and typically develops in adolescence during a growth spurt. Adult scoliosis can be the result of untreated or unrecognized childhood scoliosis, or it can actually arise during adulthood. (Spine School)
Scoliosis can have drastic effects on a child's or adult's quality of life. For example, in a recent 50-year scoliosis study published in the Journal of the American Medical Association, people with untreated scoliosis were significantly more likely to develop chronic back pain and cosmetic changes. Other potential health problems have also been linked to scoliosis, including:

- Increased risk of osteoporosis
- Gall bladder problems

- Menstrual irregularities
- Childbirth difficulties
- Depression (as a result of bracing treatment)
- Low self-esteem
- Problems with sexual intercourse
- Difficulty with sports activities (SCOLIOSIS--How does scoliosis affect quality of life)

Treatment of scoliosis traditionally consists of bracing or surgery depending on the extent of the curvature. Bracing in treating adolescent idiopathic scoliosis risks regression to original curve once the brace has been removed (Spinal--Scoliosis). Adults who had been surgically treated for scoliosis in their youth are at risk for disk degeneration and spinal fusion failure. (Massachusetts General Hospital Treadwell Library) Thus, there is a need to screen for early detection of scoliosis and begin with conservative/alternative treatments as soon as possible, as well as providing alternative treatments in managing pain/discomfort of adults suffering from disk degeneration, etc., post surgery. Examples of such treatments are massage/manual therapy and exercise/yoga.

This paper will discuss background and rationale toward medical massage therapy for prevention of worsening and minimizing pain/discomfort in long term sufferers of scoliosis, as well as the potential of reversing scoliosis in adolescents.

ETIOLOGY

Idiopathic scoliosis, which results in spinal deformity, is by far the most prevalent form of scoliosis and is categorized into three groups:

- Infantile scoliosis—birth to 3 years old
- Juvenile scoliosis—3 to 9 years old
- Adolescent scoliosis—10 to 18 years old (curvature progression is increased during puberty, when the growth rate of the body is the fastest). (Ullrich, 2004)

In adults, scoliosis can result from several conditions, most common is a person whom had scoliosis as a child/adolescent and the abnormal spine curve has increased into adult life or is becoming painful with aging. The second is seen in patients whom have never had scoliosis as a child but begin to develop an abnormal curvature with aging. The spinal deformity in degenerative scoliosis is usually a mild side curvature involving predominantly the lower levels of the spine.

SIGNS AND SYMPTOMS

Most typically, symptoms of scoliosis may include one or several of the following:

- One shoulder is higher than the other
- One shoulder blade sticks out more than the other
- One side of the rib cage appears higher than the other
- One hip appears higher or more prominent than the other
- The waist appears uneven (Ullrich, 2004)

Symptoms related to adult scoliosis are mostly due to degeneration (wear and tear) of structures that support the spine. These changes which are often called "arthritis of the spine" can occur at all levels of the back (neck, upper back and lower back). With aging and arthritis, a gradual

narrowing of the disc spaces between vertebrae, wearing out of the joints, as well as stenosis. Most people's spines become stiff but do not develop abnormal curves. Others spines lose their structural stability with aging and gradually develop abnormal curvatures that can be painful and lead to symptoms including back pain, stooped posture, leg problems (numbness, heaviness, tingling, pain and weakness) and progressive difficulty in walking which requires frequent rests and activity limitation.

CLINICAL EVALUATION

As the vertebral bodies rotate, the spinous processes deviate more and more to the concave side and the ribs follow the rotation of the vertebrae. The posterior ribs on the convex side are pushed posterior, causing the characteristic rib hump seen in thoracic scoliosis. The anterior ribs on the concave side are pushed anterior. (Richardson, 2000) The effect of the horizontal rotation is seen best on forward bending. Notice that the "hump" is not the spine but rather right ribs that have been rotated backward. (Fig. 2) A left breast will seem to be larger as the left ribs are as rotated forward as the right ribs are rotated back. As the condition progresses, the vertebrae and spinous processes in the area of the major curve rotate toward the concavity of the curve. The ribs are close together on the concave side and are spread wide on the convex side.

Radiography and Curvature Measurement

In addition to a comprehensive medical evaluation and examination, scoliosis is assessed by obtaining X-rays of the entire spine in the standing position. Scoliosis is confirmed when an X-ray reveals a lateral deviation (curve) measuring more than 10 degrees. (Scoliosis)
The Cobb method is the standard (by the Scoliosis Research Society) for measuring the curvature. (Fig. 4) To use the Cobb method, one must first decide which vertebrae are the end-vertebrae of the curve. These end-vertebrae are the vertebrae at the upper and lower limits of the curve which tilt most severely toward the concavity of the curve. Once these vertebrae have been selected, a line is drawn perpendicular to the upper margin of the vertebra which inclines most toward the concavity. A line is also drawn on the inferior border of the lower vertebra with greatest angulation toward the concavity. The angle of these transecting lines is noted and recorded. (Cailliet, M.D., 1980)

One should also describe whether the convexity of the curve points to the right or left. If there is a double curve, each curve must be described and measured. Scoliosis is generally described as to the location of the curve or curves (thoracic curve, thoracolumbar curve, lumbar curve, double major curve).

Once one has measured the angle of curvature, one may then estimate the degree of rotation of the vertebra at the apex of the curve by looking at the relation of the pedicles to midline. A further goal of the radiographic examination is to determine the physiological or skeletal maturity of the patient. As mentioned above, once skeletal maturity has been reached, curvature below 30 degrees do not progress. Therefore, one may at this time consider discontinuing follow-up examinations in this population, and scoliosis screening in the general population of children. (Richardson, 2000)

Curves that are less than 10 degrees are not considered to even represent scoliosis but rather spinal asymmetry. These types of curves are extremely unlikely to progress and generally do not need any treatment. If the child is very young and physically immature, then the progress of the curve can be followed during the child's regular check up with his or her pediatrician. If the curve is noticed to progress beyond 20 degrees, then the child should be referred to an orthopedic surgeon for continued treatment.

Curves that are between 20 to 30 degrees in a growing child can be observed at 4 to 6 month intervals. Any progression that is less than 5 degrees is not considered significant. If the curve progresses more than 5 degrees, then the curve will need treatment. Any curve over 30 degrees in a skeletally immature patient (child who is still growing) will need treatment.

Treatment for patients with progressing curves, or curves over 30 degrees in a skeletally immature patient, is usually centered on use of a back brace.

Surgery for scoliosis is only recommended for patients with curves that are greater than 40 to 45 degrees and continuing to progress, and for most patients with curves that are greater than 50 degrees. The main objective of scoliosis surgery is to fuse the spine so that the curve will not continue to progress into adulthood.

ALTERNATIVE TREATMENT RATIONALE

Because idiopathic scoliosis is considered a deformity, scoliosis treatment is largely centered on reducing or limiting the progression of the deformity and is not focused on treatment of pain. Although pain may not be a factor in the adolescent scoliosis patient, it may be a factor in adult scoliosis. Treatment of adult scoliosis is directed at the particular problem, which is causing symptoms in a patient. In some patients the leg numbness or weakness is most bothersome while in others it may be back pain alone.

The abnormal spinal curves are associated with imbalances in the paraspinal muscles, which run parallel to the spine and act upon it. The muscles on the long aspect (convexity) of the curvature become overstretched and weakened. The muscles on the short aspect (concavity) of the curvature become overworked and tightened. This muscle imbalance causes further distortion of the spinal column and an uneven weight distribution over all of the facet joints. The facet joints on the inner aspect of the curve are damaged by chronically working under increased pressure. The uneven demands on the facet joints can cause wear-and-tear arthritis and can lead to degeneration of the interverterbral discs. (BACK CARE BASICS) (Pullig Schatz, M.D., 1992)
Massage Therapy

The goal of the massage/manual therapist is to try and restore balance to the paraspinal muscles. By assessing restriction/tension in each vertebra and then utilizing that assessment to increase movement in either a strengthening capacity (fast cadence) or stretching capacity (slow cadence), the therapist can work to achieve this goal. Visits need to be frequent, at least 3 times a week, and extensive for months to years depending on progression and growth phase of the patient. Proper patient education is also vital. Patient must take an active role in exercises for continued strengthening and stretching, complementing the massage/manual therapy.

Yoga

The body with scoliosis has developed a highly sophisticated compensating 'act' and it can also learn a more refined symmetrical 'act' with proper instruction. This is accomplished by stretching muscles that have tightened and strengthening muscles that have become weak from this asymmetrical imbalance. Thereby the body will create a more effortless posture using the bone structure, rather than over working the muscles to hold itself up. Through yoga, one can find that balance point that allows the scoliosis curve to coexist with gravity and activates the body's natural plumb line. The result for most people with scoliosis is better posture and less pain. (Browning Miller)

Also the book “BACK CARE BASICS” (Pullig Schatz, M.D., 1992) provides a chapter on Scoliosis providing a number of poses and rationale to effectively stretch the paraspinal muscles.

CONCLUSION

Early screening detection for scoliosis is vital to the success of alternative therapy--massage/manual therapy and exercise/yoga. At a young age, a child’s body is still growing and will accept structural change. As a patient gets older the shape of the spine has developed and will become more permanent, thus decreasing the likelihood of reversing the scoliosis.
Also at the early stage of scoliosis with curvatures between 10 and 30 degrees treatment is strictly observation. Why not as a massage/manual therapist take an active role and see if therapy can reverse the curvature. The patient at this point is seeing a lack of symmetry in their body and is becoming self conscious, giving them ambition to try something instead of just waiting to see if it would progress. I wish I was offered this option as an adolescent since I personally suffered from scoliosis and experienced this physical and psychological turmoil. I have put the word out to the pediatric and family physicians in the area that I would like to make a difference for young scoliosis patients utilizing massage/manual therapy.

BIBLIOGRAPHY

Browning Miller, E. (n.d.). Yoga therapy for scoliosis. Retrieved Apr. 05, 2006, from Why Yoga for Scoliosis Web site: http://www.yogaforscoliosis.com/yoga.html.
Cailliet, M.D., R. (1980). Scoliosis diagnosis and managment. 6th ed. Philadelphia: F. A. Davis Company.
Grand Blanc Spine Center, (n.d.). Scoliosis--how does scoliosis affect quality of life. Retrieved Apr. 05, 2006, from Grand Blanc Spine Center Web site: http://www.gbspinecenter.com/scoliosis.html., (n.d.).
Massachusetts general hospital treadwell library. Retrieved Mar. 22, 2006, from Treatment for Adult Scoliosis Web site: http://www.mgh.harvard.edu/library/wc.asp?tm=n&page=000068_11.htm.
Paraspinal muscles. (n.d.). Retrieved Apr. 05, 2006, from http://www.allaboutbackpain.com/html/files_links/spine_anatomy_muscle.html.
Pullig Schatz, M.D., M. (1992). Back care basics. 1st ed. Berkeley, CA: Rodmell Press.

Richardson, M. (2000). Approaches to differential diagnosis in musculoskeletal imaging--scoliosis. Retrieved Apr. 05, 2006, from http://www.rad.washington.edu/mskbook/Scoliosis.html.
Scoliosis. (n.d.). Retrieved Apr. 05, 2006, from Orthospine Web site: http://www.orthospine.com/?frameSrc=/medical_conditions/frame_adult_scoliosis.html.
Spinal--scoliosis. (n.d.). Retrieved Apr. 05, 2006, from Pediatric Orthopedics Web site: http://www.pediatric-orthopedics.com/Treatments/Scoliosis/scoliosis.html.
Spine school. (n.d.). Retrieved Mar. 03, 2006, from Spine University Web site: http://www.spineuniversity.com/public/spinesub.asp?id=101.
Ullrich, P. (2004). Retrieved Apr. 05, 2006, from Spine-health.com Web site: http://www.spine-health.com/topics/cd/scoliosis/scoliosis01.html.

Consensus agreement on the design and conduct of systematic reviews with Low level laser therapy for musculoskeletal pain and disorders.

Approved by the World Association of Laser Therapy at the 5th World Congress, in Guaruja, Brazil, November 27th 2004.

Definition

Low level laser therapy (LLLT) in musculoskeletal disorders refers to monochromatic light therapy with lasers which have a mean optical output of larger than 1 mW, i.e. lasers in classes III, IIIa and IV. A similar definition applies for light therapy with light emitting diodes (LEDT) when the mean optical output is larger than 1 mW. It should be made explicit whether the systematic review or meta-analysis includes either LLLT or LEDT, or both.

1. In general, clinical trials with low level laser therapy (LLLT) should have a control group where patients receive placebo-LLLT or another reference treatment, and include procedures for randomization and patient-blinding,
2. The reporting of a systematic review should be presented according to the QUORUM statement from (http://www.thelancet.com) The Lancet, Moher et al. 1999; 354:1896-1900.
3. The inclusion criteria should be clearly stated. Patient selection criteria should ensure that the hypothesis is tested on a homogeneous patient sample. Co-intervention with steroids in more than 15% of the patients is a valid reason for exclusion of trials, as steroids block the anti-inflammatory effect of LLLT. Diagnostic inclusion criteria should be subjected to a limited focus on disorders that have fairly similar pathological manifestation. The review should explicitly state which possible biological action(s) of LLLT that are expected and under investigation. The site of laser exposure should include either:

    A. The site of pathology (tendon, joint capsule, cartilage, ligament, muscle, bone, wound, etc)
    B. The nerve supplying the painful and/or paralyzed area
    C. The acupuncture or trigger points
    D. Other sufficiently described locations

The review should explicitly evaluate and label each trial in one of these categories. SR&MA should only focus on one category, as the biological actions of LLLT are most likely to be different for each of the categories. If more than one category is included, SR&MA should make distinctions between the categories. In such cases, subgroup analyses for each category, and if needed an additional category for trials using a mixture of exposure sites, should always be performed.

Adequate dosage reporting should not in itself lead to lack of inclusion of a trial. WALT acknowledges incomplete dosage reporting as a major problem, and has instituted future standards for dosage reporting. However, WALT has detailed knowledge on the specifications of older laser models, and in many cases it has been possible to calculate missing data. If needed, WALT musculoskeletal advisory board can be contacted, and will try to be of assistance in calculating missing data on treatment parameters [1].

Dose limitations should either be used as inclusion criteria, or as a tool for sub-grouping trials for separate analyses. WALT musculoskeletal advisory board has acknowledged that optimal doses exist for several musculoskeletal complaints [2, 3]. Scientific evidence is graded at two levels, optimal dose and likely optimal dose interval, and a list diagnoses is available at WALT website. Trials with non-optimal doses according to WALT standards should be not be included or sub grouped as non-optimal dosage in SR&MA.

Language restrictions should be avoided as LLLT- trials are being published in different languages in all six continents of the world. Reviewers should rather seek linguistic assistance for translation of trial reports, than excluding them for linguistic reasons. WALT musculoskeletal advisory board can be contacted, and will try to be of assistance to overcome linguistic problems with translation of trial reports.

4. Methodological assessments should include assessment of randomization and blinding procedures. This may either be performed through inclusion criteria assessments or in the methodological assessments or it can be performed with checklists or other instruments later in the review. Exclusion of trials from statistical analysis and conclusions by poor methodological assessment results should be avoided as checklists have proved to be rather unreliable in general [4] and particularly unreliable for the LLLT-literature [5]. Analysis of methodological quality may have some value in increasing the precision of effect size calculations [6], and may be subjected to sub-group analyses.
5. Outcomes should be selected from current valid and reliable measures as recommended by organizations like the American College of Rheumatology, European League Against Rheumatism. Preferably outcomes of pain, physical function and quality of life should be provided if the material allows for this. Examples of valid instruments are Western Ontario and McMasters Universities Osteoarthritis Index (WOMAC), Visual Analogue Scale (VAS) for pain, Arthritis Impact Measurement Scale 2 (AIMS2), AUSCAN for hand osteoarthritis, Shoulder Pain and Disability Index (SPADI).
6. Statistical pooling of results should preferably be made according to current standards as used by either European League Against Rheumatism (EULAR), Cochrane Collaboration, British Medical Journal or the Oxford Internet Pain site (www.jr2.ox.ac.uk

oxford league pain). In cases of missing data and graphical data presentation only, data can be imputed from visual inspection of graphs. In cases of missing variance data, a reasonable estimate from other similar trial data can be acceptable if handled conservatively by using the largest reasonable variance data from other studies which are similar in size and patient selection criteria. However, in both cases of missing data, the imputing of virtual data should be stated.

7. The Consensus agreement is valid until the 6th Congress of World Association of Laser Therapy. Updates on optimal treatment will be continuously considered and subject to alteration if the WALT musculoskeletal advisory board finds it necessary.

References

1. Bjordal, J.M., et al., A systematic review of low level laser therapy with locationspecific doses for pain from chronic joint disorders. Aust J Physiother, 2003. 49(2): p. 107-16.
2. Bjordal, J., C. Couppé, and A. Ljunggreen, Low level laser therapy for tendinopathy. Evidence of a dose-response pattern. Physical Therapy Reviews, 2001. 6(2): p. 91-99.
3. Tuner, J. and L. Hode, It's all in the parameters: a critical analysis of some wellknownnegative studies on low-level laser therapy. J Clin Laser Med Surg, 1998. 16(5): p. 245-8.
4. Juni, P., et al., Direction and impact of language bias in meta-analyses of controlledtrials: empirical study. Int J Epidemiol, 2002. 31(1): p. 115-23.
5. Bjordal, J.M., A quantitaive study of bias in systematic reviews. Advances inPhysiotherapy, 2003. 5(2): p. 83-96.
6. Verhagen, A.P., et al., Impact of quality items on study outcome. Treatments in acutelateral ankle sprains. Int J Technol Assess Health Care, 2000. 16(4): p. 1136-46.

Consensus agreement on the design and conduct of clinical studies with Low level laser therapy and light therapy for musculoskeletal pain and disorders. (Article 2)

Approved by the World Association of Laser Therapy at the 5th World Congress, in Guaruja,

Brazil, November 27th 2004.

Definition

Low level laser therapy (LLLT) in musculoskeletal disorders refers to monochromatic light therapy with lasers which have a mean optical output of larger than 1 mW, i.e. lasers in classes III and IIIa. A similar definition applies for light therapy with light emitting diodes (LEDT) when the mean optical output is larger than 1 mW. Trial reports should make explicit whether LLLT or LEDT is being used.

1. In general, clinical trials with low level laser therapy (LLLT) should have a control group where patients receive placebo-LLLT or another reference treatment, and include procedures for randomization and patient-blinding.
2. The reporting of a trial should be presented according to the CONSORT guidelines from The Lancet (http://www.consort-statement.org).
3. Several leading journals require, or will in the near future require, that the trial is registered in a public trials register, prior to the start of the trial to ensure that not only

positive results are being published. Several registers exist, and one such register can be found at http://www.controlled-trials.com

4. In particular, item 4 in the CONSORT guidelines, calls for a specific description of the intervention. A specific description of LLLT should include the number of treatment session and the frequency of sessions per week, and the following parameters from one treatment session [1, 2]:

   Wavelength in nanometers and color

   Average output of the laser in milliWatts (mW) and spot size on the skin in square cm (cm2), or intensity in mW/ cm2 which can substitute both the above parameters

   Treatment time in seconds

   Energy Dose delivered in Joules

   Accumulated energy delivered from all sessions in Joules

5. Co-intervention with steroids should be avoided as steroids block the effect of LLLT (Lopes-Martins et al. 2004).

6. The review should explicitly state which possible biological action(s) of LLLT that are intended. The site of laser exposure should be clearly stated and include either:

   A. The site of pathology (tendon, joint capsule, cartilage, ligament, muscle, bone, wound, etc)
   B. The nerve supplying the painful and/or paralyzed area
   C. The acupuncture or trigger points
   D. Other sufficiently described locations

   WALT musculoskeletal advisory board has acknowledged that optimal doses exist for several musculoskeletal when treatment administered to the site of the pathology, complaints [1, 3]. Scientific evidence is graded at two levels, optimal dose and likely optimal dose, and a list diagnoses is available at WALT website. These parameters are based on imaging studies that provide data for estimation of energy loss and statistical testing that has verified that these parameters are significantly more effective than other parameters. Using dosage outside the optimal parameters in trials requires a detailed hypothesis and rationale for the treatment parameters used in the trial report. Authors should be aware that trials with non-optimal doses according to WALT standards should not be included or sub grouped as non-optimal dosage in systematic reviews and meta-analyses of LLLT.

7. Outcomes should be selected from current valid and reliable measures as recommended by organizations like the American College of Rheumatology, European League Against Rheumatism. Preferably outcomes of pain, physical function and quality of life should be provided if the material allows for this. Outcome measures should be quantified either by

continuous scales or categorical scales of at least 5 categories. Examples of valid pain measures are pain at rest, pain during physical activities or pain at palpation measured by a pressure algometer [4]. Examples of physical function are pain free muscle strength [4], maximal walking distance in 6 minutes, and the Back Performance Scale [5]. Examples of health-related measures of quality of life are Medical Outcomes Survey Short-Form 36. For systemic inflammatory conditions, measures of disease activity should be included. Other valid generic outcome measures instruments are Western Ontario and McMasters Universities Osteoarthritis Index (WOMAC)[6], Visual Analogue Scale (VAS) for pain, Arthritis Impact Measurement Scale 2 (AIMS2), AUSCAN for hand osteoarthritis, Shoulder Pain and Disability Index (SPADI)[7], Roland Morris disability index or Oswestry Pain and Disability index.

8. Statistical analysis of results should preferably be made according to current standards as used by either European League Against Rheumatism (EULAR), Cochrane Collaboration, or British Medical Journal. As such, the reporting of means for pre-treatment and post-treatment outcomes and the mean difference in change between groups and their respective variance data and parametric tests of p-values for significance, is expected for normally distributed data. For outcome data that are not normally distributed, medians and quartile should be used together with non-parametric tests.

9. This Consensus agreement is valid until the 6th Congress of World Association of Laser Therapy. Updates on optimal treatment will be continuously considered and subject to alteration if the WALT musculoskeletal advisory board finds it necessary.

References

1. Tuner, J. and L. Hode, It's all in the parameters: a critical analysis of some wellknown negative studies on low-level laser therapy. J Clin Laser Med Surg, 1998. 16(5): p. 245-8.
2. Bjordal, J.M., et al., A systematic review of low level laser therapy with location specific doses for pain from chronic joint disorders. Aust J Physiother, 2003. 49(2): p. 107-16.
3. Bjordal, J., C. Couppé, and A. Ljunggreen, Low level laser therapy for tendinopathy. Evidence of a dose-response pattern. Physical Therapy Reviews, 2001. 6(2): p. 91-99.
4. Smidt, N., et al., Interobserver reproducibility of the assessment of severity of complaints, grip strength, and pressure pain threshold in patients with lateral epicondylitis. Arch Phys Med Rehabil, 2002. 83(8): p. 1145-50.
5. Magnussen, L., L.I. Strand, and H. Lygren, Reliability and validity of the back performance scale: observing activity limitation in patients with back pain. Spine, 2004. 29(8): p. 903-7.
6. Bellamy, N., et al., Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of hip or knee. J Rheumatol, 1988. 15(12): p. 1833-40.
7. Heald, S.L., D.L. Riddle, and R.L. Lamb, The shoulder pain and disability index: The construct validity and responsiveness of a region-specific disability measure. Physical Therapy, 1998. 77(10): p. 1079-1088.