

Orthopaedic Manual Physical Therapy- History, Development and Future Opportunities

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Abstract

I would like to start this historical paper by expressing my gratitude to the Editor-in-Chief for providing me with the opportunity to contribute to my chosen profession as an Associate Editor for the Journal of Physical Therapy (JPT). The start of a new professional journal such as the Journal of Physical Therapy allows us to reflect on the role we would like to see such a journal play in the ongoing development of our profession. In my 20 years as a physiotherapy clinician, educator and researcher I certainly have seen significant and ongoing changes with regard to increased professional autonomy, responsibility, scope of practice, educational level and opportunities, and research efforts. All of these developments have led to an ongoing paradigm shift that has had and continues to have a major impact on how our profession is developing. As a Physiotherapist with a special interest in orthopaedic manual physical therapy (OMPT), my goal for this paper is acquaint the reader with the definition, history and development of OMPT, which will lead us to a discussion of future opportunities and challenges and the role I envision for the JPT in addressing such future developments.

Manual therapy is among the oldest interventions in medicine with records of its use dating back over 4,000 years. Although currently manual therapy is a well-established part of physiotherapy practice around the world, few therapists are aware that it has been a continuous and inextricable part of the physiotherapy scope of practice dating back at least as far as 1813 AD, with noted contributions to the field by our professional colleagues for now almost two centuries. This paper intends to acquaint the reader with the definition, history and development of orthopaedic manual physical therapy (OMPT) with specific attention to the paradigm shift within OMPT from an authority-based to an evidence-based and now an evidence-informed paradigm. This historical paper concludes with suggestions for the role the Journal of Physical Therapy might play in the ongoing development of OMPT.

Key words: Orthopaedic Manual Physical Therapy, History, Evidence-Informed Practice

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Definition of Orthopaedic Manual Physical Therapy

Both as an entry-level skill set and as a postgraduate specialization, OMPT is a well-established part of physiotherapy practice around the world, although perhaps more so in Europe, Australia and New Zealand, and North America. Whereas many of our patients and health care colleagues from other professions may equate OMPT exclusively with the high-velocity, low-amplitude thrust maneuver, it, of course, also encompasses a great

variety of other techniques. The American Physical Therapy Association has defined manual therapy techniques as "...skilled hand movements intended to improve tissue extensibility, increase range of motion, induce relaxation, mobilize or manipulate soft tissue and joints, modulate pain, and reduce soft tissue swelling, inflammation or restriction..." Techniques include massage, manual lymphatic drainage, manual traction, mobilization/manipulation, neural mobilization, joint stabilization, self-mobilization exercises, and

Key points and pre-publication history of this article are available at the end of the paper.

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passive range of motion.^{1,2} Within physiotherapy in the United States defined synonymously as “a manual therapy technique comprised of a continuum of skilled passive movements to joints and/or related soft tissues that are applied at varying speeds and amplitudes, including a small amplitude/high velocity therapeutic movement”, in most other parts of the world the term manipulation is used to describe a thrust technique performed at a pathological endrange of a joint, whereas mobilization describes a non-thrust, sustained or oscillatory, low-velocity movement within or at the end of range of joint motion.¹

Adding an emphasis beyond the purely technical and thereby also reflecting the recent paradigm shift we will discuss later from an authority-based to an evidence-based and now evidence-informed paradigm, in 2004 the International Federation of Orthopaedic Manipulative Physical Therapy (IFOMPT) defined OMPT as “...a specialized area of physiotherapy/physical therapy for the management of neuromusculoskeletal conditions, based on clinical reasoning, using highly specific treatment approaches including manual techniques and therapeutic exercises. OMPT also encompasses, and is driven by, the available scientific and clinical evidence and the biopsychosocial framework of each individual patient...”³

Early Manual Therapy

Manual therapy is among the oldest recorded influential interventions in medicine. Documentation of its practice dates back over 4,000 years to Egyptian scrolls (Edwin Smith papyrus) and its use is also depicted in ancient Thai sculptures.⁴ The first mention of massage appears in 2598 BCE in the oldest existing medical work, the Nei Ching dedicated to the Chinese Emperor Huang Ti. Ancient Indian and Greek texts, including the work of Hippocrates, describe massage as an effective

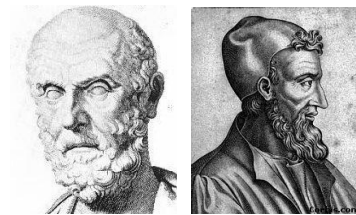


Figure 1

Figure 2

therapy for treating injuries resulting due to war or sports.⁵ Hippocrates (460-385 BCE) (Figure-1) described a combination of traction and manipulation on the back of a patient lying prone on a wooden bed in his treatise, *On Setting Joints by Leverage*.⁶ Whether Hippocrates solely attempted by this method to reposition traumatically displaced vertebrae or if he intended to manipulate slightly luxated vertebrae for a variety of indications to this day remains a matter of debate.⁷ The Roman physician Galen (131- 202 CE) (Figure-2) commented on Hippocrates’ techniques in 18 of his 97 surviving treatises, as did the



Figure-3



Figure-4

Arabic physician Abu Ali ibn Sina, also known as Avicenna (980-1037 CE) (Figure 3). Hippocrates’ manipulative procedures were again included in the 16th century writing of Guido Guidi and Ambrose Pare (Figure 4). Pare (1506-1590), a military surgeon who served four French kings, in 1580 advised the use of manipulation in the treatment of spinal curvature. In 1656, Friar Thomas described manipulative techniques for the extremities in his book, *The Complete Bone Setter*, and in as late as 1674 Johannes Scultetus still included descriptions of Hippocrates’ manipulative methods in his text, *The Surgeon’s Storehouse*.⁸

Manipulation fell out of favor in medicine when Sir Percival Pott (1714-1788) described tuberculosis of the spine and condemned traction and manipulation as not only useless but dangerous.^{6,8} However, manipulation in the form of bone-setting continued to be practised with some of its lay practitioners attaining great notoriety including Sarah Mapp in 18th century and Sir Albert Baker in 20th century England, who both counted royalty among their patients. In the United States, the male

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members of the Rhode Island Sweet family were reputed to possess hereditary skills in bone setting. One of them, Waterman Sweet, in 1829 even published a text called, *An Essay on the Science of Bone Setting*. Bone-setting continues to be practiced today in large parts of the world by lay practitioners as a form of folk medicine.⁹

During this time, manual therapy in medicine was relegated to a number of fringe clinicians, foremost among them the 1784 Edinburgh University graduate Edward Harrison. Harrison published in the *London Medical and Physical Journal* on a proposed pathophysiological connection between spinal subluxations and visceral disease and adjusted vertebrae by pressing on the spinous or transverse processes with his thumbs or with a device.^{6,7,10} In 1828, Glasgow physician Thomas Brown popularized in the medical community the concept of "spinal irritation". Brown proposed that a shared nerve supply could implicate the spine in visceral disease and nervous conditions, which led him to target the spine with non-manipulative heroic medicine interventions including local blistering, application of leeches, and cautery. Dr. Isaac Parrish of Philadelphia introduced the concept of spinal irritation in North America with an article on the topic in *The American Journal of Medical Sciences*.^{10,11} Riadore, a prominent London physician practising manipulation, stated in 1842, "if an organ is

insufficiently supplied with nervous energy or blood, its function is decreased and sooner or later its structure becomes endangered".⁶ With at least their theories acceptable even to many eminent 19th century medical physicians, it is easy to understand how first osteopathy after 1874 and then chiropractic after 1895 and its offshoots, naturopathy after 1902 and naprapathy after 1905, rapidly gained widespread acceptance among at least the American general population.

Early Physiotherapy

Examples of renewed medical interest included an 1867 paper in the *British Medical Journal* that reported on a lecture by Dr. James Paget, *On the Cases that Bonesetters Cure*. In 1871, Dr. Wharton Hood wrote a series of papers for the *Lancet* complementary to bonesetting based on his experiences with a bonesetter by the name of Hutton and in 1882 there was a discussion of bonesetting at the 50th annual meeting of the British Medical Association.^{6,8} The successful establishment of thriving practices by the earliest Swedish-educated physiotherapists in various countries, including the United Kingdom, may have brought about this renewed interest.

Physiotherapy as a government-sanctioned, university-educated profession began when in 1813 in Stockholm Pehr Hendrik Ling (1776 -1839) (Figure 5) founded the Kungliga Gymnastiska Centralinstitutet



Figure-5

or Royal Central Institute for Gymnastics (RCIG) in Stockholm.¹² Students at the RCIG were either noblemen or belonged to the upper echelons of society; most were also army officers. They were instructed in physical education, military gymnastics (mainly fencing, which was not surprising considering Ling's background as a fencing master and his personal experience with its effects on physical wellbeing), and physiotherapy (medical gymnastics). The RCIG education included a strong

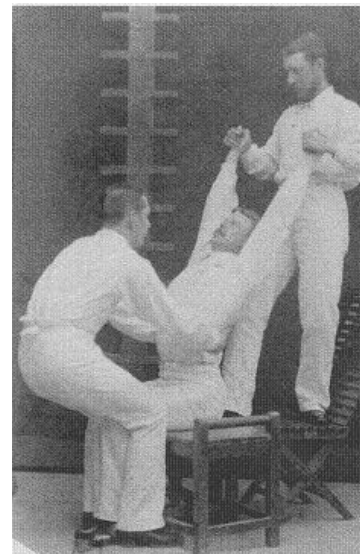


Figure-6.

Thoracic traction ad modum Ling (Reproduced with kind permission from Dr. Ottoson, <http://www.chronomedica.se/>)

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manual therapy component, leading medical historian Dr. Anders Ottoson¹³ to describe physiotherapy as the world's oldest manual therapy profession easily predating osteopathy and chiropractic (Figures 6 and 7). Although by today's standards the OMPT techniques instructed can hardly be called sophisticated, RCIG-educated clinicians further developed and published on more specific manipulative interventions.¹⁴



Figure 7. Temporomandibular joint mobilization ad modum Ling (Reproduced with kind permission from Dr. Ottoson, <http://www.chronomedica.se/>)

Empowered by their scientific training and propelled by an unwavering conviction that physiotherapy could positively affect many conditions including a multitude of non-musculoskeletal pathologies (and thereby not unlike osteopathic and chiropractic practitioners), RCIG graduates traveled around the globe to disseminate their current best

evidence approach to patient management. As early as the 1830's they established clinics in many European cities. Foreign doctors and laymen traveled to Stockholm to study with Ling's successor professor Lars Gabriel Branding (1799-1881). Meanwhile in Sweden, an 80-year turf war erupted between these early physiotherapists and the fledgling orthopaedic medicine specialization, from which the orthopaedic physicians at the Karolinska Institute eventually emerged victorious.^{12,15}

Physiotherapy education in Sweden and eventually world-wide was restructured to a technical education producing allied health technicians. In English-language countries physiotherapy was often practised by nurses with additional course work in massage and exercise therapy. In other Western European countries, physical education teachers with additional course work in rehabilitative exercise, often begrudgingly gave up their previous professional independence for support from the medical profession in their search for societal recognition.¹⁶

In rapid succession these physiotherapy technicians established national associations. In 1889 in the Netherlands, physiotherapists founded the world's first professional association, the Society for Practising Heilgymnastics in the Netherlands. In 1894 in Great Britain, the Society of

Trained Masseuses was founded and in 1906 in Australia the Australasian Massage Association.^{16,17} Physiotherapy in the United States had a relatively late start with the founding of the American Women's Physical Therapeutic Association in 1921. When the US entered World War I, it did not, in contrast to its European allies, have a military with an established division of physiotherapy. By command of the Surgeon General, a number of university physical education programs, instituted physiotherapy "War Emergency Courses" to train women who could physically rehabilitate returning soldiers.

As a result, 90% of World War I physical therapists came from schools of physical education; in fact, the physician then in charge of the Army Physiotherapy Division stipulated that all therapists have 4-year university degrees in physical education in addition to their physiotherapy training. When in 1922 the military reduced therapy services as a result of government cutbacks many therapists previously employed by the military were forced into the private sector. This led to conflicts with other manual medicine practitioners including nurses, osteopaths, and chiropractors all claiming to practice physiotherapy. It was this early conflict with especially the chiropractic profession that caused therapists to align themselves more closely with medical physicians. To garner physician support, US physiotherapists in 1930

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voluntarily relinquished their right to see patients without physician referral.¹⁸

In the US, this close alliance with the medical profession and the adversarial relationship between physicians and especially chiropractors also had physiotherapists in their communication with physicians de-emphasize the use of manual therapy in their clinical practice, although these interventions continued to be used and further developed within the profession with various publications during this period on this topic in the US physiotherapy literature.¹⁹ In Western Europe and Scandinavia, this adversarial stance never developed. Instead, medical physicians embraced osteopathy, chiropractic, and the various manual medicine approaches indigenous to Europe. Through-out Europe, postgraduate manual medicine training institutes were well attended by physicians and even academic chairs in manual medicine were established.²⁰

These European physicians also educated their physiotherapy technicians in manual therapy. Dr. James Mennell (1880-1957), the medical officer at St. Thomas Hospital in London, taught manipulation to therapists as of 1916. His son, Dr. John McMillan Mennell (1916-1992) (Figure 8), educated both physicians and therapists worldwide in manipulation and with Dr. Janet Travell co-founded the North American

Academy of Manipulative Medicine.



Figure-8



Figure-9

Dr. James Henry Cyriax (1904-1985) (Figure 9), Mennell's successor at St. Thomas, stated that physiotherapists were the most apt professionals to learn manipulative techniques. He is most known for developing and instructing to therapists and physicians worldwide his system of orthopaedic medicine emphasizing clinical diagnosis and conservative management by way of friction massage, exercise, manipulation, and infiltration. Less well-known is his link to early Swedish physiotherapy though his father Dr. Edgar Cyriax (1874-1955) and his maternal grandfather Jonas Henrik Kellgren (1837-1916), both RCIG graduates. Another influential person teaching manipulation to therapists at this time at the London School of Osteopathy was Dr. Allan Stoddard, qualified both in medicine and osteopathy. Therapists and physicians were also educated in manual therapy at the British School of Osteopathy as of 1920.⁸

Orthopaedic Manual Physical Therapy Approaches

Without a doubt the most influential person to again increase the emphasis on manual therapy within the profession of physiotherapy

and arguably “the father of manual therapy” was Norwegian-born Freddy Kaltenborn (1928-). Already trained as a physical education teacher in 1948 he was admitted as the first male student to the Norwegian program in physiotherapy. Educated in London in orthopaedic medicine by Dr. James Cyriax from 1952-1954 and qualifying in chiropractic in Germany in 1958 and in osteopathy at the London School of Osteopathy with Dr. Stoddard in 1962, Kaltenborn –from 1968 on associated with physical therapist Olav Evjenth (Figure 10)- developed an eclectic manual therapy system known as the Kaltenborn-Evjenth approach.¹⁵



Figure-10
(From left- Evjenth, Kalternborn)

With Kaltenborn the first to apply the new science of arthrokinematics to manual therapy,⁸ central to the Kaltenborn-Evjenth approach is the emphasis on restoration of the gliding component of a normal joint roll-gliding movement. Also central is the concept of a treatment plane defined as the plane across the concave joint surface. With manual translatoric techniques

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defined in this system as encompassing traction, compression, and gliding techniques, traction and compression are performed perpendicular to this treatment plane, whereas gliding techniques induce movement parallel to this plane. Mobilization and manipulation techniques are used to reduce pain and increase range of motion. Joint restrictions are classified as peri-articular, articular, intra-articular, or combined in etiology. Peri-articular restrictions due to adaptive shortening of neuromuscular and inert structures (including skin, retinacula, and scar tissue) and articular structures (capsule and ligaments) are treated with sustained mobilization techniques, whereas peri-articular restriction due to arthrogenic muscle hypertonicity is managed with neurophysiological inhibitory techniques including thrust techniques.²¹ Intra-articular restrictions are treated with (traction) manipulation initiated from the actual resting position.²²

In Australia, physiotherapist Geoff Maitland (1924-2010) (Figure 11), after studying abroad with Cyriax and Stoddard and physiotherapists Gregory Grieve and Jennifer Hickling developed his own approach and started teaching this OMPT system at the University of Adelaide in the entry-level physical therapy program. The world's first 3-month postgraduate certificate was offered in 1965. In 1974, 12-month postgraduate

diploma courses in manipulative therapy were offered at physiotherapy programs in Australia. This approach to manual therapy is now referred to as the Maitland or Australian approach.²³

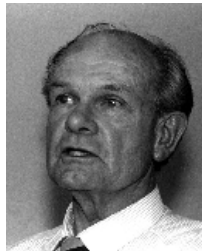


Figure-11
(Geoffrey Douglas Maitland)

Although often associated with variations of the non-thrust postero-anterior pressure technique, the Maitland system uses a whole spectrum of thrust and non-thrust techniques. Perhaps its greatest contribution is its emphasis on structured clinical reasoning. History taking is used to gather information that is used in the subsequent physical examination to establish the patient's concordant or comparable signs. A concordant sign consists of pain or other symptoms reproduced upon physical examinations that are indicated by the patient as his or her chief complaint or reason to seek out therapy.²⁴

A thorough history-taking allows the clinician to distinguish between concordant and discordant signs. Discordant signs are findings on physical examination seemingly implicating a source of symptoms that are, however, in no way related to the chief

Complaint.²⁵ Unique to the Maitland approach are also the frequent immediate post-intervention re-evaluations of the deemed most relevant concordant or so-called asterisk signs to guide further management.



Figure-12
(Stanley V Paris)

In 1960, New Zealand physiotherapist Stanley Paris (Figure 12) received a scholarship from the New Zealand Workers Compensation Board to study with Freddy Kaltenborn and Allan Stoddard. Upon his return to New Zealand he organized courses and introduced –among others– physiotherapists Robin McKenzie and Brian Mulligan to manual therapy before leaving to teach and practice in the US. Once there, Paris became the voice of manual therapy as a specialization within orthopaedic physiotherapy both within the US and worldwide. Denied access as a non-physician to the North American Academy of Manipulative Medicine by Dr. Janet Travell, he founded the North American Academy of Manipulative Therapy in 1968, which was disbanded in 1974 to become the Manual Therapy Special Interest Group in Canada and the

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Orthopaedic Section of the APTA in the US. Together with among others physiotherapists Grieve, Kaltenborn, Lamb, and Maitland, Paris also founded in Montreal in 1974 the International Federation of Orthopaedic Manipulative Therapists (recently renamed to IFOMPT), the first recognized subgroup of the World Confederation of Physical Therapy. At the urging of Kaltenborn, Paris was again involved in 1991 in organizing the American Academy of Orthopaedic Manual Therapy.^{6,8,15} He also developed an eclectic OMPT system with a unique diagnostic classification system and an emphasis not on addressing pain but on treating dysfunction defined as a state of altered mechanics, either an increase or decrease from the expected normal, or the presence of an aberrant motion.²⁶

New Zealand physiotherapist Robin McKenzie (Figure 13) developed a strongly research-based approach to management of spinal and extremity conditions called the Mechanical Diagnosis and Therapy (MDT) approach that incorporates examination and

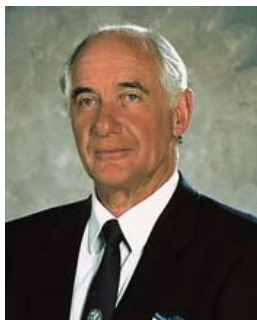


Figure-13
(Robin A McKenzie)

treatment by way of sustained and repeated active patient-generated movements and, if required, mostly non-thrust manual therapy interventions. Classification into postural, dysfunction, or derangement syndromes is guided by patient report of pain during repeated movement examination occurring within range or at endrange and by the possible occurrence of centralization and peripheralization.

Unique to the MDT concept and indicative of the derangement syndrome- strongly associated in the spine with discogenic dysfunction- centralization is defined as “the situation in which pain arising from the spine and felt laterally from the midline or distally is reduced and transferred to a more central or near midline position when certain movements are performed”. Peripheralization describes the opposite condition whereby movements cause pain to be felt more distally or laterally from the midline.²⁷

New Zealand physiotherapist Brian Mulligan (Figure 14) suggested minor positional faults as an etiology for joint dysfunction thought to respond to a unique manual therapy intervention called mobilizations with movement (MWM).²⁸ With an MWM the therapist applies a sustained accessory glide, long axis rotation, or combination while the patient actively performs a previously but now no longer painful movement.



Figure-14
(Brian R Mulligan)

The Mulligan approach shares with the Kaltenborn approach an emphasis on restoration of the gliding component of the normal joint roll-gliding movement.²⁹ Central to both is also the concept of the treatment plane but whereas Kaltenborn emphasizes gliding techniques in the direction normally associated with the restricted physiological motion, Mulligan often starts with a sustained glide at a right angle to this physiological glide. An iterative process then tests glides in different directions or long axis rotation before settling on the most effective direction allowing for pain-free active range of motion or isometric muscle contraction, together constituting the MWM.^{29,30} Mulligan’s NAGs or natural apophyseal glides are mid to endrange facet joint mobilizations applied anterosuperiorly along the treatment plane. Sustained natural apophyseal glides or SNAGs combine active movement with therapist-applied mobilization. The techniques are supported by a home program of self-mobilization and corrective taping.²⁸

Based to a large extent on pioneering work by Breig,³¹ Australian physiotherapists Robert Elvey,

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David Butler (Figure 15), and Michael Shacklock (Figure 16) have contributed greatly to our understanding of the possible role of impaired neural mobility in the etiology of neuromusculoskeletal dysfunction.^{32,33}



**Figure-15
(David S Butler)**

Also used in diagnosis, interventional neural mobilization techniques attempt to restore normal neural mobility or neurodynamic function in relation to the structures surrounding the nerve by inducing stretch or tension in the effected nerves or by mobilizing the surrounding tissues.²



**Figure-16
(Michael Shacklock)**

Butler has more recently expanded on this approach by integrating new insights with regard to pain physiology and this emerging knowledge on pain physiology has the potential to complement and at times replace the previously dominant mechanical

hypotheses in determining the indications and content of manual therapy management.³⁴

Other manual therapy systems include eclectic systems such as the Grimsby, Canadian, and Dutch manual therapy approaches. The Grimsby approach developed by Norwegian physiotherapist Ola Grimsby and the Canadian approach initially developed by Canadian and English physiotherapists David Lamb, Erl Pettman, Cliff Fowler, Jim Meadows, Ann Hoke, and Diane Lee are derived mainly from the Kaltenborn-Evjenth approach but continue to be developed into progressively more distinct systems of diagnosis and management.³⁵⁻⁴⁰ Most characteristic of the Grimsby approach is its emphasis on very specific exercise progressions. The Canadian approach emphasizes the use of screening examinations to guide further examination and diagnosis. The Dutch manual therapy system⁴¹ combines various manual therapy approaches developed within medicine, physiotherapy, chiropractic, and osteopathy and bases diagnosis and management on assumptions with regard to three-dimensional joint motion behavior and on extrapolations related to somato-somatic and somato-autonomic neuro-anatomical connections.

Although often erroneously associated with Pehr Hendrik Ling, Swedish massage was popularized in the late 19th century as a viable medical treatment by

Dr. Johan Georg Mezger (1838-1909), a Dutch physical education teacher turned physician.¹⁶ Traditional or - when applied to athletes-sports massage⁴² incorporates effleurage or rhythmic stroking hand movements, petrissage or kneading, tapotement or manual percussive massage, friction or deep penetrating pressure delivered through the finger tips, and vibration or shaking.⁵ James Cyriax promoted deep friction massage transverse to the fiber direction for the treatment of ligament and tendon injuries⁴ and from this various instrumented-assisted versions have developed including most prominently Graston technique and ASTM (assisted soft tissue mobilization).

Physiotherapists also use soft-tissue mobilization, which includes techniques intended to affect muscles and connective tissues such as stretching, myofascial release, trigger point techniques, and deep tissue techniques.² Active release technique (ART) is a form of deep tissue technique developed by the chiropractor P. Michael Leahy.

In ART, protocols based on symptom patterns are linked to manual treatment of specific anatomic sites. Specific techniques are then used for release of proposed soft tissue adhesions that consist of applying deep digital tension usually with the thumb or two fingers combined with both active and passive passage of the tissue through this area of deep tension. An active home stretching

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program follows this manual treatment.⁴³

Manual therapy interventions include both static and facilitated stretching. In the 1950s, physiotherapists Margaret Knott & Dorothy Voss⁴⁴ developed proprioceptive neuromuscular facilitation (PNF) that by way of a combination of isometric contractions and mid through endrange movements in three-dimensional naturally occurring spiral and diagonal patterns used reflexogenic activation and relaxation for specific stretching, strengthening, and stabilization. Post-isometric relaxation is a European manual medicine technique similar to a PNF hold-relax-stretch technique in that the patient is asked to gently contract a muscle from a slightly lengthened position followed by a further gentle stretch upon relaxation.⁴⁵

In the late 1930s, Dr. Janet Travell (Figure 17), at that time a cardiologist and medical researcher, became interested in muscle pain.



Figure-17
(Janet Travell)



Figure-18
(David Simons)

In the early 1960s, physiatrist Dr. David Simons (Figure 18) and his wife, physiotherapist Lois Simons, started collaborating with Travell, which eventually resulted in the *Trigger Point*

Manuals, consisting of two volumes on the upper and the lower half of the body.^{46,47} Although initially in addition to spray-and-stretch techniques heavy ischaemic pressure was advocated as a manual technique for treatment of myofascial trigger points, the updated second edition of the first volume instead suggested the use of gentle digital pressure or manual trigger point pressure release.⁴⁸

Paradigm Shift

The above approaches to OMPT were all developed in a time when the traditional medical paradigm was still the predominant paradigm guiding clinical practice. Kuhn⁴⁹ first adopted the term paradigm to refer to a set of practices that together defined a scientific discipline in a given historical period. The defining set of practices of the traditional medical paradigm was that patient management was guided mainly by a pathophysiologic rationale or extrapolation from basic science and by knowledge provided by respected authorities in the field. With its emphasis on expert opinion this traditional medical paradigm has also been called the authority-based paradigm.⁵⁰ Associated with this paradigm, diagnostic classification models used within OMPT at that time (and still to this day) were an amalgam of patho-anatomical and mechanism-based classification models. The patho-anatomical classification assumes a direct correlation between underlying pathology and signs and symptoms,⁵¹ whereas the mechanism-

based classification system is based on the premise that dysfunctions identified during examination are the cause of pain and decreased function.⁵² The intent of this amalgam of patho-anatomical and mechanism-based OMPT diagnosis is to identify the joint(s) and/or soft tissues implicated, the extent of damage to the tissue, the possible neuro-reflexive extension of the local impairment, and the levels of reactivity and ability for a targeted or selective response to intervention within the nervous system.⁴¹

Kuhn⁴⁹ described how scientific revolutions come about by way of paradigm shifts, whereby a change occurs in the basic assumptions within the predominant or central theory of a specific scientific discipline. Although Kuhn reserved his observations for the hard sciences, the term paradigm shift has since also been applied to other fields of study and practice including medicine and the other health sciences, specifically to describe the shift from the traditional medical paradigm to the evidence-based practice (EBP) paradigm.

The EBP paradigm can be traced back to the late 1970s, when a group of clinical epidemiologists at McMaster University in Hamilton, Ontario in Canada led by David Sackett published a series of articles in the *Canadian Medical Association Journal* for practicing physicians on critical appraisal of research information found in professional journals.

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In 1990, Dr. Gordon Guyatt, an internal medicine specialist and residency director of internal medicine at McMaster University, then proposed plans for restructuring the residency program to one based less on authority-based knowledge and more on knowledge and understanding of the relevant medical research literature. His first choice for the name of this new paradigm, *scientific medicine*, understandably met with more than a little resentment and resistance from his colleagues and the university administrators but a second try by Guyatt at renaming this new paradigm to *evidence-based medicine*, proved more fortuitous and this new method of teaching medicine gained acceptance at initially McMaster University and in rapid succession at increasing numbers of medical programs worldwide. Acknowledging the broad application of this new paradigm also in areas of health care clinical practice other than solely medicine, the terms evidence-based health care or EBP have since been widely adopted.⁵³

Evidence-based practice has since also rapidly been embraced by other health care professions including physiotherapy.⁵⁴ Within current-day OMPT the EBP paradigm is most closely associated with the treatment-based diagnostic classification system in which a cluster of signs and symptoms from the patient history and physical examination ideally derived from clinical prediction rule (CPR) or other relevant

research is used to classify patients into subgroups with specific implications for management. Clinical prediction rules (CPR) are decision-making tools that contain predictor variables obtained from patient history, examination, and simple diagnostic tests; they can assist in making a diagnosis, establishing prognosis, or determining appropriate management.⁵⁵

Within the OMPT community, this paradigm shift from the authority-based to the EBP paradigm has met and continues to meet with noted resistance. For many, their perception of an overreliance in this paradigm on strictly defined types of research evidence in the decision-making process seemed mirrored in the early definition of EBP as the “conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients”.⁵⁶ Of course, the often unwarranted and extravagant claims made in the early days by EBP proponents, the perceived disregard for established clinical practice, and a social context that involved clinicians trying to maintain their autonomy in the face of increased managerial influence within the health care system, increasing financial constraints on clinical practice, and the need for increased risk management strategies have not helped to diminish the resistance to the paradigm shift.^{57,58} Other justified criticisms have been related to the fact that the emphasis of EBP was (at least

initially) placed on solely medical practice, that its evidence concerned single clinical interventions rather than the more pragmatic multi-intervention approaches common in areas of health care other than medicine, and that there was an overemphasis within the paradigm on evidence produced by randomized controlled trials (and meta-analyses of such trials), a study design modeled after pharmacological research and considered less appropriate for producing evidence relevant to these other health care professions.⁵⁹ An even more powerful philosophical criticism against the adoption of EBP as the predominant paradigm in OMPT but also in physiotherapy in general is that the evidence-based rational model of decision-making does not reflect the reality of the individualized and contextualized clinical practice. This holds true especially in non-medical practice such as OMPT clinical practice in which the health problems with which patients present are often multifactorial and less well defined than in medical practice.⁶⁰

However, in the face of all this resistance and criticism it should be recognized that EBP is not a static concept.⁵⁸ Although at first the paradigm undeniably placed the randomized controlled trial on an undeserved pedestal as the only truly relevant form of evidence to guide clinical practice, EBP has evolved to where it now adopts a more inclusive view of evidence that recognizes not only the value

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of different research designs but also of clinical expertise, patient values, and preferences, and even contextual factors in the clinical decision-making process.^{57,59} As such it more closely mirrors the extended diagnostic process relevant to rehabilitation professionals proposed by the World Health organization in the *International Classification of Functioning, Disability and Health*⁶¹ (Figure 19). Sackett et al⁶² also de-emphasized the perceived pre-eminence of research evidence in favor of an EBP paradigm supported equally by three pillars when they defined the paradigm as the process of integrating the best research evidence available with both clinical expertise and patients' values.

Over time, EBP has changed its focus from a consistent use of best available research evidence to an approach that acknowledges that clinical decision-making requires a judicious mixture of many forms of knowledge other than research evidence including once again clinician experience and expertise.⁵⁸ In effect, the paradigm has changed from being evidence-driven to one that is evidence-informed.⁶³ Practicing under the evidence-informed paradigm, the clinician takes the evidence from research into account when making his or her clinical decision with regard to patient management but evidence does not dictate this

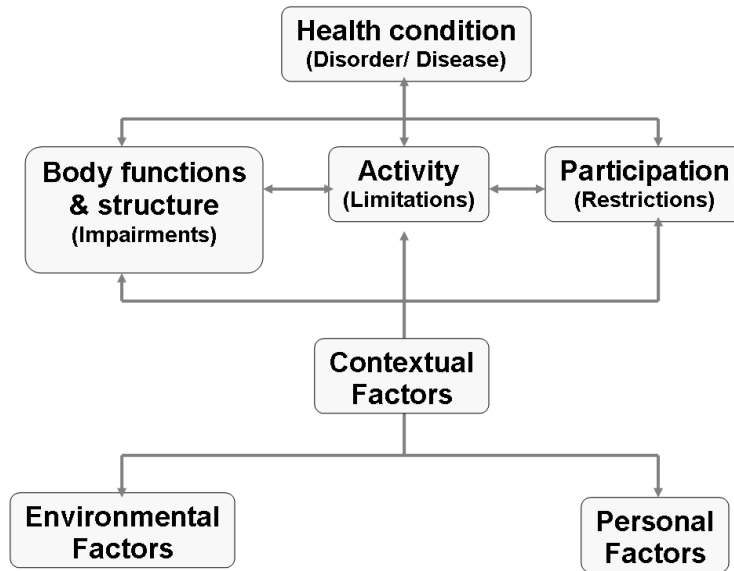


Figure-19
(ICF Conceptual framework relevant to diagnosis in rehabilitation)

Decision.^{57,58} However, adopting the evidence-informed paradigm does not represent a solely semantic difference in that the term is more palatable to many clinicians. The evidence-informed paradigm has not redefined EBP to simply include clinician experience but rather acknowledges that as clinicians we recognize the importance of and are learning to combine the various types of knowledge in addition to research evidence that form the basis of real-life clinical decision-making.⁵⁸

Future Developments and a Role for the Journal of Physical Therapy

In discussing the history and development of manual therapy, this paper should serve to highlight to the reader not only the contribution made by physiotherapists to technique and concept development and research within manual therapy

but also that manual therapy has been a continuous and inextricable part of the physiotherapy scope of practice dating back at least as far as 1813. With the increasing integration of research evidence into clinical practice and the associated paradigm shift from an authority-based to an evidence-based and now an evidence-informed paradigm, as also stressed by IFOMPT in their definition of OMPT,³ we find ourselves as a profession learning to integrate various diagnostic classification models relevant to OMPT and various rationales for determining indications, contra-indications, and precautions for use of diverse manual therapy interventions. Perhaps most important in this regard is the emerging knowledge with regard to pain physiology and implications on the integration of OMPT interventions within a

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comprehensive and multidisciplinary approach to management of especially patients with chronic pain syndromes.

It is my hope that the Journal of Physical Therapy will serve as a medium for exchange of information between clinicians, educators and researchers. Specific to my interest area of OMPT, I would hope to see a respectful and constructive discussion that values and acknowledges the importance of clinical experience and expertise, basic and applied research evidence, but also contextual factors relevant to patient management, integrating art and science of OMPT in the form of case reports and case series, narrative and systematic literature reviews and meta-analyses, research studies, commentaries, historical papers and any other form of communication relevant and committed to optimal, patient-centered and evidence-informed clinical care for our patients.

Ethical approval
Exempted.

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Key points:

Past- The techniques used in orthopaedic manual physical therapy (OMPT) were used well before the name "Physical Therapy (PT)" came into existence. History is filled with moments of milestones and of pride and glory.

Present- The recent developments are owed mainly to international collaborations especially in education and research, and its dissemination through evidence-based practice (EBP).

Future- Studies on further paradigm-shifts will improve the perception and levels of professionalism among physical therapists not only in the field of OMPT but in PT as well. Impact analysis of such paradigm shift is thus warranted.