

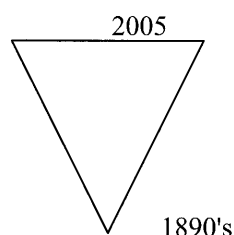
# Grand Theory of Physiotherapy

Gillian Webb

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'Physiotherapy 'Grand Theory' is not a term that is commonly used in physiotherapy literature. The theories underpinning physiotherapy may be considered to deal with the understanding of human movement, disorders of human movement and the rehabilitation of movement. Physiotherapy in the 21<sup>st</sup> century is a very broad and diverse profession. The questions could be asked: Is there such a thing as Grand Theory?: Is there just one Grand theory?

To understand this we need to examine the history of physiotherapy. The first obvious thing that comes to my mind is the incredibly changing nature of physiotherapy. The evolution of the profession in just over 100 years is remarkable. We could consider the growth of physiotherapy like that of a pyramid that is upside down. We have started as a profession as a single entity. Over time we have expanded, grown, changed and are continuing to do so as health care changes and also the global community changes.



The following overview of physiotherapy is just that. It is not a fully documented research review but rather a small glimpse at periods of development in physiotherapy across the world.

The Physiotherapy profession as we know it started education programs in three countries in the 1890's - England, The Netherlands and Australia. Physiotherapists or masseurs worked in hospitals under the direction of doctors. There were only a few graduates and they were mostly female. Services were obviously very limited.

The next major changes occurred as a result of two world events. Firstly, there were worldwide epidemics of poliomyelitis. This is a disease that attacks the dorsal horn cells of the CNS(Central Nerve System). Here is where physiotherapists started work with massage and exercise. Detailed knowledge of manual muscle testing arose as polio randomly affects muscles. Therefore, differentiating the muscles and their actions and functions was very important. Manual muscle testing is a skill that is still taught and valued in physiotherapy programs. It means that students must have a detailed knowledge of the muscular system and are able to differentiate muscles from each other in order to be specific in exercise prescription. Out of this period the Oxford grading system for grading muscles clinically was developed.

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Ded. MclinED. President of International Society of Educators in Physiotherapy.  
Doctrate of Education, Masters of Clinical Education, Graduate Diploma, Exercise for Rehabilitation, Diploma of Physiotherapy.  
Deputy Head of Educational Programs Coordinator and Clinical Coordinator  
The School of Physiotherapy, The University of Melbourne, Melbourne, 3010 Australia  
E-mail: g.webb@unimelb.edu.au  
Tel.: +61 3 8344 4171, Fax.: +61 3 8344 4188

The second event was the soldiers returning from World War II who needed rehabilitation. Management of returned soldiers with amputations, head injuries and fractures changed the practice of physiotherapists once again. Now there was a need for gait re-education, balance retraining and different exercise programs.

In England, cardiorespiratory physiotherapy was being developed and spread to other countries. In industrialized countries diseases such as tuberculosis, emphysema, bronchiectasis and chronic obstructive airway disease were prevalent. This led to the development of techniques such as postural drainage, localised breathing exercises and coughing. This branch of physiotherapy was developed at the Brompton Hospital in England, which is still a major site for advances in cardiorespiratory physiotherapy.

Neurological physiotherapy developed along many different pathways. In the beginning, there were similar approaches used for most people with disabling conditions. The 1940's saw the development of new approaches to the treatment of neurological conditions. Much of the neurological research was driven by the needs of children with, for example, cerebral palsy, Duchenne's muscular dystrophy and other development abnormalities. Rood (1954) developed the theory of ontogenetic sequence, the interaction of somatic, autonomic and psychic factors and their role in the regulation of motor behaviour.<sup>1)</sup> Treatment sought to activate movement and postural responses of the patient in the same automatic way that they occurred in people without disabilities. Sequence of movement was stressed as was sensory stimulation

Proprioceptive neuromuscular facilitation - Knott and Kabat (1954), as reviewed in Bennet and Karnes (1998)<sup>1)</sup>, developed the use of

patterns of movement, quick stretches, postural reflexes, manual pressure, isometric and isotonic contractions and approximation of joint surfaces. This system started with children then was used with adults with neurological deficits and now widely used also in those with musculoskeletal conditions.

The Bobaths (Neuro developmental treatment) developed their theories of rehabilitation around abnormal postural reflex activity, abnormal tone, sensory deficit, balance, normal movement and postural control. They worked with both children and adults. Their work is still prevalent today and has been adapted and refined. The activity of individual muscles and muscle groups was secondary to their coordination in patterns of activity.<sup>1)</sup>

These theorists provided frameworks for treatment programs. They added to what is now known about the central nervous system (CNS) and about abnormal movement when damage occurs to the CNS. They were based on the reflex-stimulus model and the hierarchical model (Bennett and Karnes 1998).<sup>1)</sup>

In Australia, Carr and Shepherd in Sydney developed theories of management based on the principles of Motor Relearning. They worked on models of motor control, relearning programs, feedback, practice, problem solving, positive reinforcement and the use of different environments. The elimination of unnecessary muscle action, feedback from information about performance and varied practice was central to their model. Muscle control and the maintenance of balanced alignment during movement was a key to better function.

It can be seen that there were many similarities between the different approaches over the last 50 years. Now more basic neuroscience research is

giving us a better understanding of the underlying mechanisms on which some of these approaches were based. Work by Jull and Richardson, and Hodges and O'Sullivan have all looked at control of muscles and their role in the prevention and treatment of pain and disability.

In the musculoskeletal area, a lot of development came from Australia through the work of Geoff Maitland (2001), basing his work on Europeans such as Kaltenborn, Cyriax and Stoddard.<sup>2)</sup> This work focused around joint structure and the use of mobilising techniques for pain reduction and joint mobilisation. This in Australia also was the start of the process of clinical reasoning, differential diagnosis and the understanding of the importance of evaluating our interventions. Other clinicians were also developing models of manual therapy. McKenzie, Mulligan and Brian Edwards combined movements and work hardening programs.

Exercise was also being used as a basis of physiotherapy treatment. Graded exercises for strengthening and mobilising were developed to deal with the needs of patients from the very weakest to elite athletes. A lot of research is occurring in this area in many different aspects of physiotherapy: pelvic floor exercises, knee exercises in osteoarthritis, cardiac and pulmonary rehabilitation just to name a few.

Electrotherapy was used widely for many different purposes and in many countries became synonymous with physiotherapy. New machines were developed that claimed to be able to treat a large number of different conditions. Again, research is being done to establish the place of different modalities in the treatment of patients. Electrical stimulation, biofeedback, laser and pulsed short wave are all being examined for evidence of their efficacy in the management of patients.

As physiotherapy has become more central in the health systems, Physiotherapists have begun working in different areas - occupational health, paediatrics, sports, schools and so on. It is a very dynamic profession, growing and developing as the health needs of the community change and as evidence is gained for the efficacy of interventions.

### **So much for history, what about now? Where are we placed in the early part of the 21st. century?**

WCPT uses the following to define physiotherapy:

Physiotherapy is providing services to people and populations to develop, maintain and restore maximum movement and functional ability throughout their lifespan. Physical therapy includes the provision of services in circumstances where the process of ageing or that of injury or disease threatens movement and function. Full and functional movement are at the heart of what it means to be healthy.

Physical therapy is concerned with identifying and maximising movement potential, within the spheres of promotion, prevention, treatment and rehabilitation. Physical therapy involves the interaction between the physical therapist, patients or clients, families and caregivers, in a process of assessing movement potential and in establishing agreed upon goals and objectives, using knowledge and skills unique to physical therapists.

The physical therapists' distinctive view of the body and its movement needs and potential is central to determining a diagnosis and an intervention strategy and is consistent whatever the setting in which practice is undertaken. These settings will vary in relation to whether physical

therapy is concerned with health promotion, prevention, treatment or rehabilitation.<sup>3)</sup>

As different models of health care have been introduced so has the scope and nature of physiotherapy practice. In the early 70's in Australia, physiotherapy education moved to the university sector across all Schools of Physiotherapy. All programs became four years in length. All Schools must be accredited for the graduates to be registered. There is not a set curriculum but each school must enable their graduates to gain the competencies required by the accreditation board.

At the same time as the move to universities occurred, Australian physiotherapists gained first contact practitioner status (1976). Now many other countries throughout the world have this status as well. This, therefore, required more emphasis on differential diagnosis and evaluation. The profession is now able to take its place alongside our medical colleagues in the provision of primary health care.

With the status of physiotherapy changing, the need for evidence of the effectiveness of our interventions became a necessity. Research based degrees were introduced into schools of physiotherapy and research in physiotherapy has advanced rapidly.

Global changes in technologies, mobility, changes in lifestyle and changes in social practices affect us all. As well, there has been a shift in health to a biopsychosocial model of health care rather than a biomedical model. This is in line with the World Health Organisation's definitions of participation and barriers to participation when defining disability. There are also changing views of health care in the community with more stress on healthy lifestyles, health promotion and injury prevention. In addition, there are marked changes

in disease prevalence worldwide and the aging of the population. As physiotherapists, we need to be constantly re-examining not only our role in the health arena but also the interventions that we use. We need, therefore, to look at promoting health and well-being and to assisting people in managing their own health at their highest functional level.

To understand our profession, we need to consider the following:

The first is practice epistemology: this refers to the nature of knowledge and the processes of generation of knowledge that underlie practice. It is important for physiotherapy to explicate and generate professional knowledge that is relevant to contemporary practice. We need to update and use it effectively (Higgs and Titchen 2004). Professional knowledge is built upon existing knowledge and upon the conscious or unconscious beliefs and values held by practitioners about what they do, how they do it, and why they do it.<sup>4)</sup>

Secondly, we need to recognise the dynamic nature of the knowledge base. This knowledge base is constantly changing as new understandings are reached in many different areas of research. Research evidence in many different fields, not just physiotherapy, helps us to understand our practice better.

Thirdly, as a profession, it is important that we acknowledge the importance of the acceptance to make credible and appropriate modifications, adaptations and innovations to practice and to practice knowledge in response to changing contexts of care.

Practice wisdom is the capacity to generate, use and critique a range of different forms of knowledge at high levels of skill in achieving successful outcomes of health and social care

interventions (Higgs and Titichen 2004).<sup>4)</sup> Practice wisdom is generated from practice experience when cognitive and metacognitive processes are linked in the clinical reasoning, professional judgements and the affective processes, which together produce cultural competence. The values, which underpin a lot of western health care, view the individual as being unique; endowed with the rights of dignity, equality and self-determination and with functional needs which are relevant to their physical, spiritual, cultural and social environment. WHO declarations focus on health, which encourage approaches to health care that focus upon individuals and their quality of life rather than their disease or disability status. This is fundamental to physiotherapy practice in the 21<sup>st</sup> century.

### **Neurosciences and physiotherapy**

Great advances have been made in the understanding of the brain and neurological structure and function. The emphasis of practice is on function and the need to get the person moving as soon as possible after an assault on the neural tissues such as in a stroke. Theories of motor control, especially the physiological basis and motor learning have evidence supporting their efficacy in the area of exercise prescription. Dynamic system theory and an understanding of kinematics and kinetics form the basis of neurological intervention. The role of the physiotherapist is now around training rather than treating. It is about problem solving through observation, analysis, decision-making, action taking and re-evaluation. The patient is now an active learner rather than a passive recipient of treatment. The patient as an active learner needs to set goals and expectations, challenge the environment and be an active participant in a multidisciplinary team approach. The training needs to be task specific training; muscle activation, whole/part practice, environmental demands, transfer of learning, highest level of

function.

The connectedness of neurological and musculoskeletal systems is now fully accepted. Perhaps we should no longer be dividing practice into neurological and musculoskeletal. Across the spectrum, we are beginning to have a better understanding of the two systems and their relationship.

### **Musculoskeletal physiotherapy**

In the musculoskeletal area of practice great emphasis is now being placed on understanding the neurophysiological basis of pain. This exciting work will be of major importance for physiotherapists. Included in this is research, in many different places, on motor control of individual muscles e.g. the role of transversus abdominus in chronic low back pain, the role of vastus medialis and other quadriceps muscles in osteoarthritis of the knee, the role of the pelvic floor muscles in the prevention of incontinence. In all these examples there is good evidence that with carefully designed exercise programs, physiotherapists can play a major role in alleviating the symptoms that are presented. Added to this is the role of exercise in many other areas of practice e.g. osteoporosis, diabetes and in falls and balance rehabilitation. Exercise for health promotion, injury prevention and injury management is of key importance to physiotherapists in the 21<sup>st</sup> century.

### **Cardiothoracic physiotherapy**

Since its beginnings cardiothoracic physiotherapy has progressed on and is now based on an increasing amount of research based evidence. No longer do physiotherapists see all patients who come in for surgery. In Australia, it is now only routine for patients with upper abdominal surgery and patients having cardiac or lung surgery. Positive pressure devices such as

continuous positive airway pressure (CPAP) and the use of intermittent CPAP by physiotherapists is relatively common in Australia, to increase Functional Residual Capacity (FRC), improve arterial oxygenation and possibly decrease the work of breathing. Early mobilization, post surgery, is seen to be very important.

For the medical chest problems, there is much more emphasis on the appropriate use of oxygen using fixed or variable performance devices, such as Aquapak, Vaturi Mask, nasal cannulae or catheters. These are used for delivering and driving flow rates of oxygen. As well, exercise tolerance and functional activities with good breathing mechanics are encouraged. Most patients coming into Australian hospitals now for any length of stay will be given a functional exercise program to stop them becoming less fit both in a cardiovascular sense, as well as from a musculoskeletal aspect during their stay in hospital.

Cardiorespiratory physiotherapy is a key part of the key management with good research evidence for people with cystic fibrosis, asthma, post cardiac surgery and chronic respiratory diseases.

As can be seen from all this, the movement is towards active patient participation and self-management/responsibility of one's own health outcome. The use of electrotherapy is still important, but in much more specific situations e.g. EMG biofeedback and diagnostic or pain management, not as a routine choice.

Exercise is a key component of all areas of practice, to enable the individual to return to as full functional capacity as possible. Research evidence is being gathered in all these areas and needs to be translated into our practice.

Physiotherapists are primary health care practitioners. They have an important role to play as direct providers of health management, as members of multi professional teams, as consultants to governments, NGO's and other relevant organizations, as developers and implementers of services and as educators of other health care personnel.

Primary health care, of which physiotherapy is a part, acknowledges that health services should be available for all people. It should be a partnership between the local communities and individuals in service delivery, planning and monitoring. It should be reflective of the local needs of the community, whilst being mindful of resources. Work will be in a variety of places and environments.

As physiotherapists we have a distinctive view of the body and its movement needs and potential, this is central to determining a diagnosis and an intervention strategy in whatever setting it is undertaken.

As physiotherapists, we are able to provide services to people, communities and populations to develop, maintain and restore maximum movement and functional ability through these lifespan. It includes the provision of services in circumstances where movement and function are threatened by the process of ageing or that of injury or disease. Full and functional movements to enable people to participate in all aspects of life and to be healthy are at the heart of physiotherapy practice. Physiotherapy is well placed because of its emphasis on non-surgical interventions and is cost effective when interventions are used that provide evidence of their efficacy.

The physiotherapy profession in the 21<sup>st</sup> century is continually evolving, responding to changes in health, illness and social changes. A

'Grand theory' is only appropriate if it also evolves with new research and knowledge that is being generated. As physiotherapists, it is our duty and obligation to be aware of new knowledge and to apply our knowledge in a professional manner. At the heart of physiotherapy is our ability to effectively communicate with our patients in order to assist them in restoring themselves to their highest functional level. This must be based on the best available research evidence.

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