



Transdisciplinary Clinical Practice between Physiotherapists and Traumatologists in Orthopaedic Medicine

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: The transdisciplinary scope is conceived as an emerging practice and corpus of knowledge since it comes from the interactions between different disciplines. Transdisciplinarity emerges to solve in a more efficient way health problems of humanity that overcome the traditional biomedical interdisciplinary attention model. In this article, the transdisciplinary physiotherapist is exposed as the beginning of an authentic dialogue between the physiotherapist and the traumatologist in the care of the orthopedic patient that includes all treatment phases of integral rehabilitation, as well as its factors to consider the possible advantages and dares that this scope may present to the health services.

Objective: This paper aims to propose to the scientific community the context of transdisciplinary clinical practice between traumatologists and physical therapists.

Methods: It is performed a grounded theory approach to develop a thesis based on our observations and a reflection of literature that intends to explain transdisciplinary clinical practice phenomenon between traumatologists and physical therapists and pose the potential outcomes of this interactions and its implications.

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Conclusion: Exist theoretical and practical background to support the clinical practice of transdisciplinary care in Orthopedic and Physical Therapy attention; which make possible professionals to develop transdisciplinary clinical skills, and team shared decision making. Transdisciplinary clinical practice, as with any educational process, should ideally foster specific shared competencies in healthcare professionals, including teamwork, leadership, consensus building, the ability to identify and achieve common patient care goals and variable shared practical skills that may even include other specialization areas.

Keywords: Teamwork; multidisciplinary; transdisciplinary; clinical practice.

1. INTRODUCTION

The complexity of our current reality requires overcoming the division and disciplinary fragmentation of the health-disease process to understand problems, since all the systems or dynamic structures that make up our world (atomic, molecular, cellular, biological, psychological, sociological, cultural, among other) are characterized by their interconnections and interactions, they are all reciprocally interdependent and they reveal as one because if they are separated they lose the emergent qualities of the "whole" into each one of its parts[1]. This means that we must move from monodisciplinary, multidisciplinary, interdisciplinary knowledge and practice to the transdisciplinary model of knowledge and praxis and identify the results of the dynamics of clinical interdisciplinary practice.

1.1 Clarification of Concepts

To better understand what is being proposed, we will analyze the continuum from discipline to transdiscipline.

2. DISCIPLINARITY

The association between discipline, departments and institutes is a relatively modern phenomenon, which began to consolidate at the end of the 19th century [2] and is the current teaching and working model. Such departmentalization has been important for the maintenance of each discipline's autonomy, to get resources for research, and for the consolidation of academic prestige as individual practitioners. Professors and disciples develop and increase loyalties to the discipline, until they perceive theirs' as the most important in the University [3].

This mono-disciplinary approach represents specialization in isolation. A person can study, for example, biology and understand it well, without

the need for complete knowledge of physics or psychology.

Disciplinarity

(Isolated specialization and practice)



3. MULTIDISCIPLINARITY

A person can study more than one area of knowledge simultaneously or sequentially, this can occur without making connections between them. One can become competent in chemistry, sociology and linguistics, for example, without thereby generating cooperation between disciplines. Multidisciplinary teams of researchers are common today [4]. In them, the members make their analyses separately from their respective disciplines, and the final result is nothing more than a series of reports bound together, without an integrative synthesis.

Multidisciplinarity

(No cooperative practice, without shared knowledge and skills)

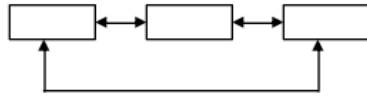


4. PLURIDISCIPLINARITY

It implies cooperation between disciplines, without coordination [5]. Normally it occurs between areas of knowledge compatible with one another, and of the same hierarchical level. Examples would be the combination of physics, chemistry, and geology, or history, sociology, and language. The study of each of them reinforces the understanding of the others.

Pluridisciplinarity

(Group practice with cooperation, with shared knowledge, without coordination, without shared skills)

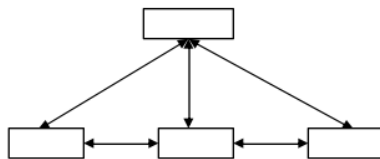


5. INTERDISCIPLINARITY

It is understood as the coordination and action by means of a higher common principle [6], in other words, it is considered as the set of disciplines with defined relationships, so that their activities do not occur in an isolated, dispersed and fractional manner. This type has two hierarchical levels and multiplicity of objectives and its coordination comes from the higher hierarchy.

Interdisciplinarity

(Group knowledge and practice coordinated in relation and by means of a higher common priority and objective without shared skills in practice)



6. TRANSDISCIPLINARITY

Transdisciplinarity occurs when there is coordination and action between and in consideration of interactions in all levels, which cannot be described in terms of multidisciplinary considering the onset of new levels of interactions and actions [7].

The term transdisciplinarity, which appeared three decades ago almost simultaneously in the works of different researchers such as Jean Piaget, Edgar Morin, Eric Jantsch and many others, was devised at that time to go beyond pluri and interdisciplinarity.

In 2000, the editorial board of the journal *Nature Neuroscience* [8], reference is made to the arising problem that experts and scientists have

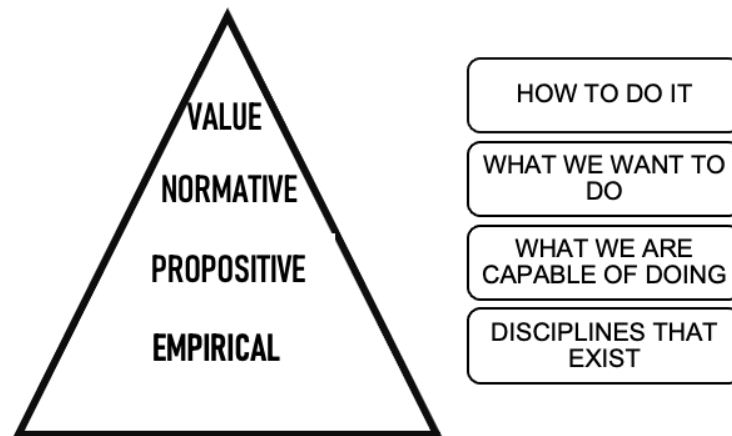
in understanding each other. It is stated that: "In Darwin's time, it was possible to write a book that was simultaneously a scientific report and a popular best seller. Today, however, this seems like a remote ideal. Not only is it difficult to communicate scientific ideas to the general public, but scientists found it increasingly difficult to communicate with each other. Even within healthcare, researchers from different areas of specialization are frequently not able to understand the papers of others". We are facing what has come to be called a "disciplinary big bang". This transdisciplinary approach is conceived as an emerging superior knowledge, the result of a dialectical movement of thought, which allows crossing the boundaries of different areas of disciplinary knowledge and creating more complete and integrated images of reality.

Any of the multiple possible vertical dynamic relationship between the four levels will define a transdisciplinary action, and may take place under different circumstances and processes along the patient's treatment and evolution from diagnosis to discharge; this multiple relations demand professionals the development of a cluster of shared knowledge, common clinical skills and common competencies in spite of the different professional background in the context of a transdisciplinary team workforce and problem solving objective.

A question arises considering this: which are the boundaries that complexity of clinical scenarios demand to be expanded and shared between professions in the context of transdisciplinarity as it may represent the solution to multiple clinical problems? Such as the surpassed health care services and its social costs, the excess of surgeons investing time solving non surgical conditions that may be solved by a different profession, overdemand of certain profession, undertreatment of common problems due to lack of workforce and collaborative common workforce to make available certain healthcare services in vulnerable countries or countries in development from a bio-psycho-socio-cultural approach.

7. COMPLEXITY

Beyond the verification of the existence of different levels of Reality, the last century has witnessed the emergence of complexity, chaos and non-linear processes in many areas of science.



Transdisciplinarity applied to health sciences

Complexity theory is an approach to studying complex systems that focuses on the interactions between the components of these systems. While variation is sometimes viewed as problematic, its presence may also be highly informative to uncover ways of enhancing healthcare delivery when it represents unique adaptations to the values and needs of people involved in the practice and interactions with the local community and the health care system [9].

8. THE THEORY OF COMPLEXITY IN HEALTH SCIENCES

Medicine, like many other scientific fields, is founded upon the classical Cartesian method of reductionism, where a problem is broken down into its smallest components, examined, and then the information gleaned is used to draw conclusions about the nature of a larger reality [10]. It is fundamental to consider this approach as an attempt to develop a linear system that allows replacing the reductionist approach of biomedical model, a successful transdisciplinary approach that may promote the possibility to predict with less uncertainty the possible outcomes of a given intervention practiced by a transdisciplinary team. An example of this might be the response of blood glucose to a dose of exogenous insulin. Frustrations arise, however, when the problem we wish to examine is not a simple linear system but rather shows non-linear behavior.

Our inability to predict the outcome in these situations is all too painfully familiar, yet it was at this problematic interface, between reductionism and real life, that the science of complexity theory was born.

9. DISCUSSING THE OUTCOME OF INTERACTIONS BETWEEN THE PHYSIOTHERAPIST AND THE TRAUMATOLOGISTS IN ORTHOPEDIC MEDICINE IN TRANSDISCIPLINARY CONTEXT

Scientific literature highlights the importance of preoperative or early immediate postoperative rehabilitation for different conditions, mainly for knee ACL, arthroplasty and hip surgery, but not limited or restricted to them.

By applying a transdisciplinary model to orthopedic surgery and physical therapy, we could break down all interaction boundaries among individuals by implementing a very flexible model working towards specific common goals [11] such as facilitating the functional rehabilitation of an individual. According to experience obtained in our clinic, transdisciplinary teams are suitable for treating patients with complex needs and chronic nature of different injuries. Communication practices and organizational structures are regarded as crucial factors for a successful transdisciplinary team model in a Functional Restoration Program. [12, 13].

Multidisciplinary practice occurs worldwide, but much less common than it might be in the practical context; if we talk about transdisciplinary approaches, we go beyond multidisciplinary ones by its implications and the result between its interactions. We suspect that this lack of multidisciplinary, and especially transdisciplinary, approaches in health service is due to an insufficient inter-professional

integration between the orthopedic surgeon and physiotherapists in private practice; public medical services in many countries may have organizational constraints.[14, 15].

We consider this missing integration may emerge from transdisciplinary patient centered attention models involving all professionals along the patient's treatment and rehabilitation process, including: pre-surgical interventions and education[16], intra-operative room data collection and surgeon assistance in decision making considering rehabilitation process, knowledge of fine surgery details, complications and particular case adaptations vital to succeed during early rehabilitation decision making/programming, immediate postsurgical procedures based on edema control, wound care, redflags detection and early derivation to surgeon in case it is needed, education, immediate graded exposure to movement strategies, opportune pain education, early exercise in the context of understanding personalized medical treatment and rehabilitation as a fused continuum process to maximize patient's confidence in the healthcare team and indications, high adherence to early treatment, and precise shared team-analyzed clinical decisions[17] rooted in a strong inter professional link along patient's treatment process[18]. All of this should be under the context of patient-centered bio-psychosocial and cultural aspects of health service.

This inter professional link may be based on shared competencies and skills developed in the context of a transdisciplinary workforce [19].

In this context, we found in literature the figure of Extended Scope Physiotherapist (ESP): Basic ESPs characteristics consist in at least 5 years' clinical experience post qualification and at least 3 years' experience in the management of orthopedic and musculoskeletal conditions[20].

Physiotherapists with transdisciplinary competencies are able to examine, diagnose and take clinical treatment decisions in patients with musculoskeletal conditions, but most importantly to work along with the traumatologist and in any patient's process, being possible to extrapolate these abilities into the early phases of rehabilitation, pre-habilitation or even during trans-surgical moments such as data collection and professional interaction that involves in-surgery assistance in order to improve multi-scope decision making that may condition future

clinical outcomes during future rehabilitation phases under some circumstances due to de corpus of full shared knowledge about each particular patient.

A physiotherapist with these characteristics has shown to contribute to counteract a potential shortage of orthopedic workforce[21] and has the potential to reduce patient waiting time in order to receive attention[22] and reduce health care costs in public services when adopting sharing tasks with traumatologist or as first level care providers related to musculoskeletal conditions.[23] This has been implemented in several countries worldwide into different clinical contexts [24-26].

Which are the current existing professional links between traumatologist and physiotherapists? Far than compare skills, this shows how specialists may complement each other on their realm basis to positively influence treatment decision making as shares of a whole process from diagnosis, during intervention and until discharge. Research shows, for example, that an experienced physiotherapist can effectively screen patients referred for orthopedic consultation in primary healthcare and even compares them with other specialists; being the physiotherapist the professional with the highest rate of diagnosis accuracy after the traumatologist [27]. Talking about diagnostic skills, physiotherapists may incorporate the medical diagnosis and expand it, given that it occurs across multiple levels or systems; physiotherapy diagnosis tend to view assessment as process-oriented and its primary purpose is to guide treatment decisions based on patients' function and objectives beyond purely structural and anatomical status [28] but considering it. It is known that also ESPT's and orthopedic surgeons registered the same or partly the same diagnosis and treatment plan. Indications of a high relational coordination implying a good inter-professional collaboration were found in literature [29].

A physiotherapist is defined as an autonomous health professional who is responsible for developing, maintaining or restoring motor function and movement throughout the lifespan using evidence-based practice. A physiotherapist relieves pain and treats or prevents physical conditions associated with injury, disease or other impairments. A physiotherapist empowers patients and their health keepers to manage the condition outside clinical settings[30].

In first instance, it is important to define the competence level of a physical therapist, both for knowledge and practice based not only in university study programs but also in clinical development dynamics as something not fixed but in constant evolution and improvement. Competencies are understood as a concept that goes beyond knowledge and includes the understanding of knowledge, clinical, interpersonal, problem solving, clinical judgment, and technical skills. This competence involves the comprehensive and behavioral definition of knowledge, skills, values and personal qualities that underlie the proper performance of multiple professional activities and tasks[30].

The “Expected Minimum Competencies for an Entry Level Physiotherapist in the European Region of the WCPT Guidance Document” includes as the highest competence level of a physiotherapist the knowledge at the most advanced frontier of a field of work or study and at the interface between fields, which considers not only a conceptual framework but also the practical, clinical and technical skills that include synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice, sustaining a commitment to the development of new ideas or processes at the forefront of work or study contexts including research[31]. A set of critical competencies are listed in this document, which include: Intervention Competencies, Inter-Professional and Trans-professional Competencies; this is the realm in which we consider the transdisciplinary skills of a physiotherapist unfold in the care of the orthopedic patient, which means that, in a framework and context of a transdisciplinary team are able to share the decision making and execute interventions based on skills and knowledge developed inside such team around orthopedic patient’s clinical situations along with the traumatologist; this makes possible founding the physiotherapist’s intervention and traumatologist’s intervention as a block of the same health intervention rather than two separate entities, two professionals sharing decisions, responsibilities, interventions, and competencies based on knowledge, skills and an ethical framework for patient’s care.

For example: a football team has several different players, with different training, skills, abilities, and competencies to achieve a common set of objectives with shared responsibilities: score a goal, avoid receiving goals and, in the

end, win by completing their proper (and theoretically exclusive) tasks. They work together and simultaneously daily, they train to accomplish their proper objectives developing and implementing new shared skills and abilities one from each other, nonetheless, in a final complex scenario during a match, in the field complexity dynamics and problematics that overpass the isolated individual skills, competencies and abilities it is demanded a shared workforce development that modify the isolated exclusive action of each player.

A striker is ideally the player whom have to score a goal but in a given context under extraordinary circumstances, a midfielder, a defender or even a goalkeeper may be able to score too due to the lack of better conditions to do it as the ideal framework posits, and due given priority situations to take action to solve a problem or complete a task opportunely. This represents transdisciplinarity in the framework of complexity which is different from multidisciplinary in which each action, skill, decision or ability remain isolated and confined to the ambit of each individual part of a group.

In spite of the possible posited identified benefits and its theoretical clinical impact given its feasibility [32] still dares to be solved such as ethic and philosophical framework, competence boundaries, cost-efficiency, [33] participant profiling, assessment of difficulties and disadvantages into private or public services contexts, and implementation and systematization strategies.

10. CONCLUSION

Exist theoretical and practical background to support the clinical practice of transdisciplinary care in Orthopedic and Physical Therapy attention; which make possible professionals to develop transdisciplinary clinical skills, and team shared decision making. Transdisciplinary clinical practice, as with any educational process, should ideally foster specific competencies in healthcare professionals, including teamwork, leadership, consensus building, the ability to identify and achieve common patient care goals and variable shared practical skills that may even include other specialization areas. Although there are barriers for transdisciplinary practice such as social and cultural backgrounds and the acceptance of existing shared competencies or skills.

We advocate for the development of principles that include critical key elements to successful flourish transdisciplinary practice in clinical contexts.

We consider that the amplification and evolution of transdisciplinary skills of physical therapists, physiotherapy and traumatologists has been documented and studied in literature; but probably the scope of studies has been isolated and not inside a transdisciplinary context like the one we are proposing, which is basically to promote high cohesive teams for complete and comprehensive management of musculoskeletal disorders, especially when it comes to treatments that involve critical decisions or interventions such as surgery plus rehabilitation process.

We hypothesize that complex clinical situations demand rather than one specialist, a set of transdisciplinary specialists team or at least transdisciplinary clinical skills of a professional in the absence of a whole team, in order to better manage and increase success rates when solving short term clinical problems and realities within the complexity of healthcare sciences in multiple social contexts.

DISCLAIMER

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, society, brands, companies, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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