

## Translational Research - Can physical therapists keep up with the science?

### Pesquisa translacional - Os fisioterapeutas poderão acompanhar a ciência?

**Wilton Remigio**

Misericordia University, Pennsylvania, The United States of America. ORCID: 0000-0001-9804-085X. wremigio@misericordia.edu

Translational research has been a buzz word in the medical community for over a decade and, lately it has attracted the attention of all allied health disciplines as they move forward in the science that defines and shapes their work niches. In 2006 the National Institutes of Health set up special research award in an effort to acknowledge the emphasis on research that is translational in nature.<sup>1</sup> The term ‘translational research’, by definition, alludes to the importance that biomedical research conducted in laboratories around the world, be developed in ways that facilitate its application and use in the world of patient care. It is often referred to in the cliché, “bench to bedside research” or simply, translating the results of lab research into actual practice. Implied in the term “translational” is an understanding that vast amounts of research generated in the basic science arena has often been lost in translation, creating canonical divides between the world of the lab scientist and that of the health professional. It might be illuminating to devote a few lines to take a deeper look into the recent history of this divide.

Historically, the chasm between research and practice has its roots in the development of post-war medicine, the emergence of Bacteriologic medicine as a research discipline, the ascension

of biological and pharmacology research as the paramount informers of medical science and its regulation by government agencies<sup>2</sup>. Medical research, up until the early 1900’s, was almost exclusively conducted by doctors and medical physiologists and as a result reflected the concerns of medical care. Biomedical research today has become overly diffused and the therapeutic focus has, to a large degree, been lost or relegated to ‘after-market’ consideration. This description is, notwithstanding the oversimplification, is still valid as an initial synthesis that can help us make sense of the various trajectories scientific investigation has meandered into. All research is, ultimately valid, interesting and useful but to what degree it is transformational regarding its potential improve the treatment of human diseases is debatable. Understanding the complex nature of this history might, in a way, dissipate some radicalization of ideas regarding this gap or prevent hasty conclusions that a mere social analysis of this issue might assume.

Methodologically, the concept of “translational research” embraces not only knowledge generation but, just as importantly, the dissemination of such knowledge. Despite the success attending scientific research worldwide, the term translational research has lost some

of its luster by the lack of application in the real world. The utilization and implementation of new discoveries don't seem to be appreciated outside of strict boundaries of established research enclaves. It is true that we are not living in the times when the discovery of the biological effects of a vitamin such as vitamin C took 264 years to become known and save thousands of lives which succumbed to scurvy in oceanic voyages of the past<sup>3</sup>. Nonetheless, asynchronies between research findings and their appearance in textbooks, educational curricula and in clinical practice still persist. It has been estimated that there is a lag time of 17 years for research findings to translate to clinical practice. Interestingly, this "magic" number has been arrived at by three independent researchers investigating the how scientific knowledge distills as health knowledge<sup>4-6</sup>.

There has been a growing concern that biological and physiological research do not supplant our need for research bearing more immediate impact on patients and that research dollars should prioritize discoveries favoring solutions to the perplexing challenges confronting health care professionals in our time. In this context, research must be relevant enough to respond to the pressing needs of today's health care and to help bring sustainable solutions to real life problems. The challenge of translation in research is shared by many stakeholders including governments who want to see the fulfilment of the promise that research will enable health systems deliver better health. These concerns have resulted in initiatives such as the Clinical Research Roundtable at the American Institute of Medicine in the year 2000. Two main "translational" categories have been described by this initiative which capture the larger picture of the challenges facing translational research today. One (T1) involving the communication of new insights into disease processes and etiopathogenesis acquired in the laboratory and its need to result in the development of new assessment tools, diagnostics, prevention strategies and therapies to benefit the care of human populations. Another block (T2), concerns how the translation of the results of clinical studies is materialized to reach day-to-day clinical practice. Despite their equally important contribution to 'translational gap' these two aspects must be understood in their own rights and differences must be evaluated. While the first one has been heftily funded by stakeholders, there

is no clause making funding contingent upon binding knowledge generation to knowledge dissemination. The existence of a mandate such as this in basic science research could bring about a change in the current state of thing and bridge important aspects of the present knowledge chasm. The second one, T2, is dependent on the ability and good will of health professionals to investigate themselves how science informs the issues they face in the care of their patients. As such it relies on access to research studies and on care providers sharing a culture of continual scientific investigation and innovation. Moreover, in order for information to influence decision making, clinicians must be able to apply contextual interpretation to the expanding volume of research papers coming out every week, and try to make sense of the possible applications and limitations to the focus of their practice. Adopting ideas from research also requires an infrastructure to allow for the adoption of pertinent innovations. In the United States, the National Institutes of Health are responsible for T1 with a funding of \$7 billion a year, and while the translation and dissemination of research is the stated mission of the Agency for Healthcare Research and Quality (AHRQ), the agency receives a budget of only \$470 million per year to accomplish this task<sup>7</sup>. Much recognition is awarded to T1 as the nobel prize, and some of the breakthroughs have been transformational such as the discovery and synthesis of insulin. Meanwhile, patient educators are struggling to survive. Approximately 5% of programs recognized by the American Diabetes Association (ADA) certified programs in diabetes education have been discontinued as many hospitals have closed their programs of patient education.<sup>8</sup> There is a clear imbalance between these paradigms, favoring funding discovery rather than dissemination of those discoveries. Everywhere, and not only in the United States T1 seems to eclipse T2.<sup>9</sup>

These considerations have not been confined to medical professionals and confront all rehabilitation professionals as well. In Canada, for instance, surveys conducted with 1800 health professionals regarding stroke rehabilitation indicate that best practices are not routinely implemented in this patient population<sup>10,11</sup> despite hundreds of scientific research papers on improving stroke rehabilitation the last 20 years. Has physical therapy practice kept

up with research? Is discovering fueling treatment in physical therapy practice to benefit patients? Physical therapy professionals have traditionally relied primordially on their academic education, their own clinical experience, or that of colleagues, and on continued education resources and maybe less on investigating the flux of scientific information streaming from research publications. However, physical therapists are very positive about the importance of evidence based practice. Unlike biomedicine, the profession developed under the shadow of Physiatrists and its techniques progressed less from the result of laboratory medicine and more from experimentalist approaches in patient care<sup>12</sup>. Today physical therapists are aware they are the authors and originators of their own science and have a mandate to generate the knowledge that will advance the profession and its contribution to human health. Today physical therapy science is equally hard pressed to develop standards of practice that are on par with the best evidence available to inform their clinical decisions and hypothesis generation.

Physical therapists can help bridge this gap by direct involvement in basic science research and, when possible, secure the interest of established researchers in projects that would more directly help the rehab world and address the various clinical dilemmas present in the movement sciences, physical medicine and rehabilitation or to explain the science of what we do. An example of this can be perceived from the work of Mary Barbe from Temple University in Pennsylvania, USA whose work has shed much light on the basic science of tissue injury and fibrosis. As a basic scientist Dr. Barbe has acknowledged the value of the partnership with physical therapists as contributors to ideas and questions that has helped guide her research agenda and path<sup>13</sup>. In a recent publication, for instance, Dr. Barbe describes the role of the heat shock protein response in overuse injuries which is relevant to all physical therapy aspiring to gaining clearer insights into the tissue responses to general versus specific work outs and more.<sup>14</sup> In Brazil and elsewhere many researchers have partnered with physical therapy departments and individual professionals in the development of research proposals which are reshaping our understanding of concerning the various repertoires of tissue responses after specific lesions and blazing the way for the design of new PT interventions.

Perhaps the most widely available way in which physical therapists can advance the vision of “translation Research” is in the realm of “knowledge transmission and dissemination”(T2). Physical therapy as a profession has avidly embraced the need to become an evidence-guided practice. To this end, it has relied substantially on investigating evidence in systematic reviews, metanalysis, case studies, case series, randomized controlled clinical trials, both quantitative and qualitative research. New accreditation standards in Physical Therapy education emphasize the need for evidence based training, in many ways has emancipated and updated the knowledge base and experience of physical therapists graduating today. But once students graduate many challenges threaten to overshadow the academic commitment gained during school time to continue staying current. Pooled research analyzing the attitudes and adoption of evidence based information in practicing physical therapists in Brazil has established that they face many barriers that hinder the fulfillment of the vision of a practice that could be continually guided by scientific discoveries. The most frequently reported barriers include: time availability, the unfamiliarity with the statistical or scientific jargon allowing them to weigh in the relevance of studies, and the lack of work environment support to implement innovations. These perceived challenges coexist despite the highly positive opinion held by respondents regarding the essentiality and importance of evidence based practice.<sup>15</sup>

If physical therapy is to avoid any degree of stagnation in the future and position itself as a profession that advances in step with current science, we need to strengthen our commitment to a culture of investigation and flexibility to adopt innovation when it is convincingly relevant and which can open new possibilities for patient care. This is also the path to increased visibility in the health care landscape of multi-professionalism and transdisciplinarity and the way to avoid staleness and adopting tradition in an era of galloping advances in technology and science which are the tools we can use if we aspire for a deeper clinical experience for us and our patients.

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