

# THREE-DIMENSIONAL NEUROREHABILITATION: A DIFFERENT PERSPECTIVE

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## BIOGRAPHY OF AUTHORS

The first author, Dr. Ahmad Z. Qureshi is a physical medicine and rehabilitation specialist with sub specializations in neurorehabilitation and interventional rehabilitation. He has a unique experience of obtaining his specialty and subspecialty training in three different regions of the globe, including Pakistan, Kingdom of Saudi Arabia and the United States. Dr. Qureshi, with help of Dr. Jenkins, has narrated his perspective on rehabilitation of neurological disabilities in three entirely different rehabilitation setups around the globe.

## ABSTRACT

The authors have narrated their perspective on rehabilitation of neurological disabilities based upon their experiences in three different regions of the globe, hence the word "three dimensional". It also reflects the need of holistic approach in neurorehabilitation. The article emphasizes the significance of impact of socio-cultural factors on disability and the way different challenges can change outcomes of the same neurological impairment in different health care systems. The understanding, perception and management of disability secondary to any neurological impairment varies greatly from one region to another across the world. Hence treatment guidelines applicable in one socioeconomic setup may not be applicable in another setting, making neurorehabilitation a very unique specialty of medicine. Conventionally, in the field of medicine, popular treatment guidelines usually originate in high income countries, which are considered standards of practice even by developing health systems regardless of the feasibility of their application. Neurorehabilitation guidelines need to be unique to health systems having socio-economic and cultural similarities. The general perception of disability and cultural needs should be given high consideration while dealing with neurological impairments; rendering the need of tailored guidelines specific to each population. This idea is new to medical education and disability care. It deserves more attention among health care providers dealing with functional limitations secondary to neurological impairments.

The term three-dimensional, or 3-D, usually refers to an object's existing along three different axes that intersect at specific angles. The three axes, or dimensions, represent height, width and depth and determine the orientation and direction of an object in space. Increasing the number of dimensions of an object from one or two to three greatly increases our perception and understanding of the object. This even impacts our perception of characteristics of the object, such as color, that we may not suspect were related.<sup>1</sup> Consider, then, the possibility of extending this "holistic" model to the rehabilitation process of patients with neurological disabilities. Could impairment categories such as stroke, brain injury or spinal cord injury be considered three dimensional? Yes, we might actually view and more fully understand any neurological impairment by exploring its multiple dimensions in different health systems around the globe. Recently, disability issues have taken on an increasingly prominent role on international stages.<sup>2</sup> I started off my

externship in Physical Medicine and Rehabilitation at Mayo Hospital Lahore Pakistan and joined the same department as a resident trainee. After spending a total of 9 months there I was selected to continue to my residency training at King Fahad Medical City where I spent 4 years. Subsequently I did a one year Fellowship in Neurorehabilitation at Wake Forest Baptist Medical Center North Carolina followed by another one year Fellowship in Interventional Rehabilitation at the same institute. I did not realize until recently that I have started to analyze impairment groups from three different perspectives based on my observations and experiences in different parts of the world. I have observed that not only disability arising from a neurological illness manifests differently in different cultures, but also the rehabilitation strategies tend to vary differently in various regions of the globe for the exact same pathology. This goes way beyond what we find in our textbooks. Imagine an object in 3-dimensional space and make a note of its surroundings. Now place

that imaginary object in an entirely different location. The object itself has not changed, but the background, brightness, colors, orientation and aura have changed. Does this also change your our perception towards that object? It likely does. Similarly, the pathophysiology of stroke remains unchanged globally, but it has a completely different outlook in different regions of the world. The perception of stroke rehabilitation then changes dramatically when you travel across continents. Across many fields of medicine, money poured into research disproportionately favors the studying of pathologies of high-income countries.<sup>3</sup> Leading authors and modern textbooks in rehabilitation medicine come from developed health systems. Many advanced treatment options are probably not applicable to most of the global disability population because disability prevalence tends to be higher in low income countries. In Pakistan, when I used to read the current textbooks of Rehabilitation, most of my understanding of rehab was imaginative, hypothetical and impractical. I was fortunate to have a great mentor who directed my thoughts toward the broader aspect of rehabilitation i.e social reintegration and empowerment. The critical issue is not how stroke is affecting your body and environment; it is actually how the environment is affecting the body and stroke. When you change the environment, you can change the pattern of stroke-related impairments. A successfully trained and independent stroke patient in the U.S may likely have to undergo a refresher course of rehabilitation if he were brought to Pakistan, and vice versa. The manner in which external factors interact with the patient is relevant to rehabilitation, but this remains a less emphasized topic of teaching in rehabilitation medicine. During our training, much importance is given to activities of daily living (ADLs). The functional Independence Measure (FIM) is one of the most popular scales for functional assessment across settings; however, is it universally valid? Studies suggest that the FIM scale has strong interrater reliability when used by clinicians in the United States.<sup>4</sup> Language and other cultural barriers have been shown to impact functional assessment scales in other specialties.<sup>5</sup> In Saudi Arabia and Pakistan, the majority of the population is Muslim and performing prayers five times a day is a common practice. This requires an individual to perform ablution before the prayers, which involves washing different parts of the body from head to toe. Though there are exceptions made for performing ablution during illness, many patients still prefer to perform this practice. Similarly, the toileting practices vary from culture to culture. Considering that, I sensed a dire need for a modified functional assessment scale for my patients during my residency. In today's globalized world, physicians are routinely expected to have a broad understanding of alternative and culturally determined medical practices.<sup>6</sup> Gender preferences, sexuality, and

social norms are unique to different cultures. For example, in Pakistan, regardless of the socioeconomic status of the patient or family, discharge disposition is barely a problem because of conventional strong family support. In contrast, the Ministry of Health Hospitals in Saudi Arabia continue to provide services to all admitted patients until their disposition is finalized. Furthermore, it is estimated that between 10% and 30% of all hospitalizations in Saudi Arabia require a need for medical rehabilitation, and ineffective implementation of current laws have resulted in services not being rendered in the most efficient ways.<sup>7,8</sup> In most rehabilitation settings, there are no insurance issues and few financial pressures involved in expediting a patient's discharge or arranging equipment. Consequently, patients get a chance to stay longer as inpatients and benefit accordingly. In the U.S, continuity of rehabilitation care post discharge is exemplary, whereas in Pakistan and Saudi Arabia, the concept of primary care physician is lacking and community-based rehabilitation is still very primitive. During my training in the U.S, I am able to relate to the materials in my textbooks more closely. Now, not only do I observe the latest management strategies, but I also practice them as well. That reminds me of the early days of my career in Pakistan. There was a patient who came for treatment of frozen shoulder. He travelled hundreds of kilometers to reach a tertiary care facility with very little money. Like many patients coming to our outpatient facility, we knew that he was there for the first and last time. This is an example of socioeconomic challenges in the management of frozen shoulder. Nowhere in any textbook would one come across any recommendations that would address the successful management guidelines in these circumstances that are common in the developing world. How does one tailor patient management in similar situations? What are the best options for a patient who would not be able to follow up with any clinician after his initial visit? These are important questions, since the medically underserved suffer higher rates of disease morbidity.<sup>9</sup> It is true that most guidelines are evidence-based, and evidence is usually collected by research. But for practical purposes, resources are not adequate to meet the growing demands of research in developing world.

I have used the term 'three-dimensional' based on my experience in neurorehabilitation in three entirely different regions of the world namely Pakistan, Saudi Arabia and United States. These medical models represent a sample of three different levels of health care systems around the globe. i.e underdeveloped, developing and developed health system respectively. In fact, I intend to propose the idea that rehabilitation of a particular neurological impairment or impairment group needs to be explored along different geographical dimensions so that the

diversity of global rehabilitation practices can be brought onto a single platform. The most ideal platform, in my opinion, would be the popular textbooks of neurological rehabilitation. Conferences and exchange programs provide a concentrated opportunity but even the largest conferences are attended by a limited number of clinicians. Their impact remains restricted to the attendees or to readers who follow literature updates. Ideas and innovations are the crux of rehabilitation sciences. Many educational and health systems in the developing world do not have the capacity to support extensive research to validate potentially effective ideas. Hence, these ideas remain hidden from the world and never get a chance to reach across borders. These practices may never get published even in local literature, and even if they do, the local readership may be negligible due to lack of access or interest. Textbooks, however, remain a common source of reference for residents, supervisors and physicians in all academic settings globally. Colleagues that are critical members of the team, such as therapists and nurses, can benefit from this as well, as cultural and sociopolitical differences among patients affects their approach to healthcare as well.<sup>10</sup> At the completion of students' training, the test of their knowledge and skills usually revolve around information contained in textbooks.

It is deemed important to have a textbook of neuro rehabilitation featuring writers from all around the globe. A key chapter on a particular topic could be followed by brief addendums from experts from different regions of the world. The regional authorship could be classified based on socioeconomic and cultural similarities. For example, North America, Europe, Russia and Australia could be grouped together, while China and culturally similar neighboring countries could be grouped together. South America, the Middle East, Africa and South Asia could have separate addendums. Similarly, regions under war could be grouped together. This approach would yield a bulk of knowledge ranging from evidence-based practices to regional practices. In this manner, thousands of trainees and specialists who rely upon rehab textbooks could become more knowledgeable with regard to both regional and international trends. This would also facilitate the input of regional representation on an international platform and promote local authorities in their respective

fields of interest. In this manner, we could strengthen our knowledge of the rehabilitation process through a multidimensional process.

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**Dr. Ahmed Zaheer Qureshi:** Study concept and design, protocol writing, data collection, data analysis, manuscript writing, manuscript review

**Dr. Randolph Mitchell Jenkins:** Data collection, data analysis, manuscript writing, manuscript review