**FUTURISTIC TRENDS IN PHYSIOTHERAPY**

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**INTRODUCTION**

Physiotherapy has today become an essential part of life for many people. The field of physiotherapy has become an increasingly important part of the healthcare system resulting in a number of growing job opportunities, the advent of new specialties, and the use of modern technology. In fact, the modern field of physiotherapy is showing dynamic expansion into a variety of new areas that carry exciting opportunities in this field such as working in standalone clinics, home care services, sports medicine, and elderly care.

Think back for a moment to what your life was like 15 years ago before technology was so far-reaching. Was it simpler or more complicated? Many people remember their technology-light pasts with fondness, while others exclaim that they don’t know how they lived without their iPhones. Really, there is no right or wrong opinion. A proliferation of new technologies in rehabilitation has recently occurred with the hope of improved outcomes, better patient compliance, and safety, and return to their day-to-day activities to athletic performance at a faster pace than expected!

Below are some of the recent advancements in the field of physiotherapy which have proved to be safe, assisted a diverse population, and appeared feasible for most clinical settings.

**1.TELE-REHABILITATION**

Telemedicine made a positive contribution to the healthcare sector during the COVID-19 pandemic in a variety of ways. Tele-health emerged as an effective and sustainable solution in bridging the gap between people, physicians, and health systems, enabling everyone, especially symptomatic patients, to stay at home and communicate with physicians and physiotherapists through virtual channels, helping to reduce the spread of the virus to mass populations and the medical staff on the front lines.

This year has been a roller coaster of change for PT sand for healthcare workers in general. We’ve seen PTs cycle through all sorts of ups and downs, from shutting down their clinics to widely adopting telehealth. Many of these changes came as a result of the COVID-19 pandemic but some are poised to make a lasting impact on the future of the rehab therapy industry.

Tele- rehabilitation is a part of telemedicine. It is the provision to offer rehabilitation services such as physiotherapy, speech therapy, occupational therapy, and aiding fitment of rehabilitation equipment such as wheelchairs, braces,or artificial limbs from a distance. Physiotherapy professionals currently use voice and video systems to currently communicate with patients and colleagues in a variety of clinical venues to offer such services through tele- medicine.1

The telerehabilitation system has proved to be beneficial for patients who live far from actual centers of rehabilitation. Since, after discharge, doctors are likely to follow up with clients, throughtele- rehabilitation, patients can reduce their regular visits to hospitals and rehabilitation facilities. This also reduces the cost of transportation and saves patients’ and doctors’ time, thus providing customers with real-time recovery services in their homes.

**2. ROBOTIC REHABILITATION THERAPY**

Research into rehabilitation robotics has grown rapidly and the number of therapeutic rehabilitation robots has expanded dramatically during the last two decades. Robotic rehabilitation therapy can deliver high-dosage and high-intensity training, making it useful for patients with motor disorders caused by stroke or spinal cord disease. Robotic devices used for motor rehabilitation include end-effector and exoskeleton types; herein, we review the clinical use of both types.2 One application of robot-assisted therapy is the improvement of gait function in patients with stroke. Both end-effector and the exoskeleton devices have proven to be effective complements to conventional physiotherapy in patients with sub-acute stroke, but there is no clear evidence that robotic gait training is superior to conventional physiotherapy in patients with chronic stroke or when delivered alone.

In another application, upper limb motor function training in patients recovering from stroke, robot-assisted therapy was comparable or superior to conventional therapy in patients with sub-acute stroke.3 With end-effector devices, the intensity of therapy was the most important determinant of upper limb motor recovery. However, there is insufficient evidence for the use of exoskeleton devices for upper limb motor function in patients with stroke. For rehabilitation of hand motor function, either end-effector and exoskeleton devices showed similar or additive effects relative to conventional therapy in patients with chronic stroke.4

The present evidence supports the use of robot-assisted therapy for improving motor function in stroke patients as an additional therapeutic intervention in combination with the conventional rehabilitation therapies. Nevertheless, there will be substantial opportunities for technical development in near future.

**3.GAMIFIED REHABILITATION APPS FOR PATIENT ENGAGEMENT**

Promoting a healthy lifestyle is a huge challenge for some practitioners and healthcare institutions, especially when the delivery method is less interactive and focuses on one-way communication. Shifting the delivery methods from traditional to digitalizing, playful, and interactive modes could bring a more favourable outcome in the rehabilitation process, as well as in individual changes of behaviour. In the past decade, many interactive methods have been introduced for rehabilitation training. These methods include the use of serious games and gamification during rehabilitation therapy, physical activity monitoring, health promotion, and rehabilitation virtual learning apps.5 The use of gamification is seen as a motivational driver to enhance individual engagement towards the rehabilitation process and, thus, reduce hospitalizations and encourage self-management. In recent years, research related to gamification in rehabilitation training has generated considerable research interest. It plays a vital role in promoting the effectiveness of the recovery process during rehabilitation and inducing efficacy from the perspective of healthcare management.6

In general, researchers have recognized gamification as using the game elements or game mechanics in activities that do not represent a gaming context, such as learning, teaching, and healthcare, while preserving the playfulness of the environment. Meanwhile, rehabilitation is a process for an individual with a health condition to return to a healthy life or one that helps them to improve abilities that they need in daily life through a series of restoration processes such as training and therapy. This process requires continuous engagement and involvement from the affected individual, and it sometimes causes stress, dropout, and unmanageable care.7 Therefore, introducing gamification into rehabilitation training helps to prevent those situations from occurring.

**4.** **INTEGRATION OF EXCERCISES**

One of the latest trends that has been emerging in the field of physical therapy is the integration and application of various different exercising and training methods into the treatment methods of physiotherapy. Pilates is considered a form of exercise that aims to improve flexibility, resistance, strength, balance, and coordination. Pilates exercise has positive benefits, including reducing pain and disability for people with musculoskeletal conditions. An exercise program ruled around Pilates and physiotherapy can facilitate an active lifestyle and self-management approach. In the case of lower back pain physiotherapy, pelvic floor muscles are increasingly incorporated into Yoga and Pilates classes.

Other techniques, include Feldenkrais physiotherapy, which develops pelvic floor awareness through movement and functional integration, and Cantienica, whereby a pelvic floor contraction is palpated externally after movements between the ischial tuberosities, greater trochanters, and the coccyx.8

**5. AQUATIC THERAPY**

In modern societies, rapid economic development and the advancement of automation technologies have made our daily activities incomparably easier, in many cases, involves a dramatic reduction in people’s exercise and human activity, which, like the western diet. These changes have led to many cases of over nutrition and a wide range of diseases caused by insufficient physical activity.

These issues raised people’s interest in various forms of exercises. It was found that regular exercise reduces the risk of cardiovascular diseases and death.9 In addition, it has been argued that people need to be encouraged to practice aerobic exercises to reduce the risk of these diseases, as they just sit most of the time.10

A side from reducing the risk of various diseases, aerobic exercises are recommended to enhance our physical and mental health.11 One of the most widely practiced forms of aerobic exercise is aquatic exercise. Aquatic exercises involve less risk of injury than exercises performed on the ground. It also reduces blood retention in the legs and fatigue as it is carried out in a streamlined rather than a standing position. It has also been reported that swimming improves venous return and reduces the risk of heart diseases.12 In addition, the buoyancy, pressure, resistance, and temperature of water maximize the effectiveness of aquatic exercise, and buoyancy allows for lighter and safer body movements.13

However, [Morgado et al. (2017)](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5931167/%22%20%5Cl%20%22b11-jer-14-2-289) emphasize the need for special caution when exposed to aggressive environmental factors such as swimming pools. Exercising in such environments may adversely impact our immune functions, in which undermines our ability to fight diseases and increases our sensitivity to chronic diseases.

Aquatic therapy has proved to be beneficial in patients with arthritis, fractures, strains or sprains, because it helps the individuals who face problems while doing weight bearing activities to recover easily.Aquatic therapy helps in reducing tension, increasing range of motion, and protecting joints from the strain of high-impact activities.Moreover, while exercising in water the blood vessels go in a state of vasodilatation. When individuals exercise in water, it will cause the vasodilatation of blood vessels. As a result, the bodyparts receive more oxygen and nutrients.

**6. ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**

Physiotherapy is one such field which helps millions of people around the world to recover successfully after suffering from physical injuries and chronic impairments. Though the necessity of this valuable care holds immense importance in a patient's entire treatment phase, there are numerous obstacles in the way such as costs, shortage of medical personnel and the need to travel to the appropriate medical facilities, something even more challenging during the Covid-19 pandemic. One approach to addressing this issue is to incorporate technology in the practice of physiotherapists, allowing them to help more patients. We would be better off focusing on modifying physiotherapy education and clinical practice for a fundamentally different future

There's is a lot of potential for intelligent machines to enhance various areas of physiotherapy practice through automization of tasks such as diagnosis, data analysis, classification and prediction.

Implementation of AI into PT practice will shape the future of healthcare delivery and education of physiotherapists. AI will make a faster diagnosis, better performance, and accurate results for patients and providers. Artificial intelligence (AI) is a field of mathematical engineering which has potential to enhance healthcare through new care delivery strategies, informed decision making and facilitation of patient engagement. Machine learning (ML) is a form of narrow artificial intelligence which can be used to automate decision making and make predictions based upon patient data.14

Many areas of clinical practice have seen success with AI based technology, including decision support system, diagnosis and prediction, image identification and natural language processing. 15

**REFERENCES**

1. Dr. Sathya P, Dr. Ramakrishnan, ‘Application of tele medicine and e-medicinne in physiotherapy emerging trends’
2. Langhorne P, Bernhardt J, Kwakkel G. Stroke rehabilitation.
3. Won Hyuk Chang and Yun-Hee Kim, Robot assisted therapy in Stroke Rehabilitation.
4. Won Hyuk Chang and Yun-Hee Kim, Robot assisted therapy in Stroke Rehabilitation.
5. A Survey on Gamification for Health Rehabilitation Care: Applications, Opportunities, and Open Challenges by NooralisaMohdTuah, Fatimah Ahmedy, Abdullah Gani and Lionelson Norbert Yong.
6. A Survey on Gamification for Health Rehabilitation Care: Applications, Opportunities, and Open Challenges by NooralisaMohdTuah, Fatimah Ahmedy, Abdullah Gani and Lionelson Norbert Yong.
7. A Survey on Gamification for Health Rehabilitation Care: Applications, Opportunities, and Open Challenges by NooralisaMohdTuah, Fatimah Ahmedy, Abdullah Gani and Lionelson Norbert Yong.
8. Alternative Methods to Pelvic Floor Muscle Awareness and Training, KavenBaessler MD and Barbara E. Bell BSc, BA.
9. Gremeaux et al. (2012) and Scherr et al. (2011)
10. Löllgen et al., 2009; Nocon et al., 2008.
11. Banz et al., 2003.
12. Ussher et al., 2003
13. Carroll et al., 2017
14. Artificial intelligence and machine learning | applications in musculoskeletal physiotherapy, Christopher Tack.
15. Michael R. Artificial intelligence in clinical practice: Implications for physiotherapy education.