

IATI Report: Israel's Rehabilitation System - Challenges And Adaptations Related To The Iron Swords War 2024-25



In cooperation with:



Israel's Rehabilitation System

Challenges And Adaptations Related To The Iron Swords War

As part of the IATI Israel's Life Science & Health – Tech Annual Industry Report, IATI and PwC Israel conducted in-depth interviews with senior officials from leading hospitals and other medical experts across the country in order to gain comprehensive understanding of the challenges and adaptations in Israel's rehabilitation system during the Iron Swords War. The following chapter brings valuable insights from these interviews, describing how medical teams coped with the unprecedented demands in the wake of the war.

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Introduction

The field of medical rehabilitation in Israel is an integral part of the healthcare system, aiming to help patients recover maximum functionality after severe injuries, illnesses, or trauma. Medical rehabilitation includes a wide range of multidisciplinary treatments, such as physiotherapy, occupational therapy, neurological and orthopedic rehabilitation, as well as psychological support.

The country's more advanced rehabilitation centers were located mainly in central regions, leaving peripheral areas with fewer resources. Psychological rehabilitation, especially in cases of post-traumatic stress disorder (PTSD), was often secondary to physical care, and the system lacked a comprehensive approach to address the mental health needs of patients alongside their physical recovery. Moreover, there was a persistent shortage of rehabilitation beds, with many centers operating at full capacity and waiting lists for admission. The system was not equipped to handle the large-scale trauma and complex injuries that would emerge in times of crisis. The onset of the Iron Swords War drastically altered the landscape of medical rehabilitation in Israel.

During times of crisis and war, such as the Iron Swords War which started on October 7th, 2023, the rehabilitation system faces significant challenges stemming both from the dramatic increase in the number of injured individuals and from the nature of their injuries. These include a high incidence of limb amputations, severe penetrating injuries, extensive burns, and complex head trauma.

In addition to physical injuries, there is an increased need to address post-traumatic stress disorder (PTSD) and severe psychological consequences among soldiers and civilians who were harmed or experienced traumatic events.

The Iron Swords War underscored the importance of rehabilitation readiness alongside urgent medical response. A major challenge that emerged was the need to integrate physical and psychological rehabilitation from the earliest stages of recovery. Additionally, the war exposed gaps in the existing rehabilitation infrastructure, particularly in peripheral areas, which led to many injured individuals being transferred to rehabilitation centers in central Israel. Additionally, changes in medical protocols, which will be further discussed later on in this chapter, significantly impacted patient's survival rates and their rehabilitation needs.

During and after the war, the medical system had to find innovative and creative solutions to cope with these challenges. The implementation of advanced technologies, such as robotic walking rehabilitation, artificial intelligence-based training systems, and digital solutions for remote rehabilitation monitoring, improved treatment capabilities while reducing the need for physical rehabilitation beds.

This chapter examines the key rehabilitation challenges revealed by the war, reviews the solutions that were implemented, and presents the technological innovations that enable better handling of emergency medical and rehabilitation situations.

Challenges in the Rehabilitation System Following the Iron Swords War

During the Iron Swords War, Israel's medical rehabilitation system found itself facing an unprecedented reality. The scale of injuries, severity of trauma, and complexity of both physical and psychological conditions created immense pressure on the system, which had to rapidly adapt and provide real-time solutions. While rehabilitation services generally operate at full capacity during peacetime, in times of crisis, these challenges are aggravated and require flexibility, creativity, and additional resources to ensure optimal patient care.

One of the most pressing issues was the lack of rehabilitation infrastructure. Israel has several major rehabilitation centers, but many were concentrated in central areas, while other regions suffered from lower availability of rehabilitation beds and advanced treatments.

With the outbreak of war and the surge in injuries, these gaps became even more apparent. Hospitals were forced to quickly expand rehabilitation capacity, open additional departments, and find alternative solutions for routine treatments that were delayed. Existing facilities were often not designed to operate under prolonged threats, necessitating special adaptations—both in terms of protective measures and relocating rehabilitation services to safer areas.

A significant challenge faced by Israel's rehabilitation system during the Iron Swords War was the disparity between the central regions, and peripheral areas. While central Israel boasts several well-established rehabilitation centers with the capacity to handle complex injuries, the periphery has a limited number of rehabilitation beds, specialized treatments, and experienced staff. This imbalance became particularly evident during the war when the number of casualties surged, and many patients were required to travel long distances to receive necessary care.

The lack of accessible rehabilitation services in peripheral areas not only increased pressure on central facilities but also disrupted the continuity of care for patients, many of whom were forced to relocate to hospitals far from home. This geographic gap highlighted the urgent need for more evenly distributed rehabilitation resources and infrastructure to ensure equitable access to care for all citizens, regardless of location.

At the same time, the shortage of medical and rehabilitation personnel became a critical challenge. A significant percentage of doctors, nurses, and therapists were called up for reserve duty, creating instability among the remaining medical teams. In a reality where the number of injured increased daily, rehabilitation professionals not only faced heavy workloads but also personal stress—some had family members serving in the military, others had to evacuate their homes due to security threats, yet they continued their work under exceptionally difficult conditions.

To address the workforce shortage, retired doctors were recruited, young therapists were rapidly trained, and efforts were made to reintegrate professionals who had moved to the private sector.

The shortage of rehabilitation infrastructure in peripheral areas became an even more significant challenge during the Iron Swords War.

While hospitals in central Israel are equipped with advanced rehabilitation departments, remote areas have fewer available rehabilitation beds, forcing many injured individuals to seek treatment far from their homes. This situation added further strain on major medical centers and disrupted the continuity of care for patients requiring prolonged rehabilitation. A particularly critical gap was the lack of pediatric rehabilitation beds north of Ra'anana.

Beyond the staffing shortage, the availability of rehabilitation equipment also became a crucial issue. Israel's rehabilitation system was primarily designed to treat geriatric patients and standard civilian injuries, but the war created a new reality—severe limb injuries, complex neurological damage, and the need for long-term rehabilitation adaptations, especially among young injured soldiers from elite combat units. Suddenly, there was an urgent demand for specialized walkers, advanced gait restoration systems, robotic rehabilitation devices, and high-precision physiotherapy equipment. Some of this equipment was secured through rapid donations, while other devices were acquired with support of nonprofit organizations and government funding. Government funding, facilitated by the Israel Innovation Authority's financing tools, was also provided as a grant, specifically through the pilot funds described in the Israel Innovation Authority 2024 Activity Summary chapter.

The complexity of injuries also highlighted another challenge—the integration of physical and psychological rehabilitation. Many patients with severe physical trauma also faced significant emotional challenges, such as PTSD, feelings of loss regarding their physical abilities, and more. The medical rehabilitation system had to develop integrative approaches, ensuring that physical and psychological rehabilitation occurred simultaneously. Without addressing the patient’s emotional state, physical recovery could also be hindered.

Mental health professionals were embedded more intensively into rehabilitation departments, and treatment plans were developed to incorporate emotional counseling alongside tailored physical exercises.

Another significant challenge involved displaced populations—individuals who lost their homes and had to temporarily relocate to hotels or other communities. For patients in the midst of a rehabilitation process, forced relocation disrupted their treatment continuity and reduced access to medical services. To address this, mobile medical teams were deployed to provide direct care at displacement sites, ensuring that rehabilitation support continued even outside traditional healthcare facilities.

In addition to these systemic challenges, significant adaptations in medical protocols implemented in the battlefield played a crucial role in improving survival rates and, consequently, increasing the number of patients requiring rehabilitation. Several key changes were implemented:

1. Deployment of doctors and paramedics at the battalion level, alongside combat soldiers. This allowed medical personnel to reach injured individuals within approximately 3–4 minutes, enabling senior medical staff to perform life-saving interventions on the battlefield.
2. A protocol change in April 2024 that reversed the traditional “ABC” resuscitation order. Instead of prioritizing airway and breathing, the new approach focused first on stopping hemorrhaging and administering whole-blood transfusions in the field.
3. The use of universal donor whole-blood units (O-negative) on the battlefield, ensuring immediate availability of life-saving transfusions.
4. A strategic shift to minimize prolonged medical procedures in the field, including intubation. Instead of performing these interventions on-site, medical teams prioritized rapid evacuation to hospitals where advanced critical care could be provided under optimal conditions.

As a result of these changes, the severity of injuries, as measured by the Injury Severity Score (ISS), was significantly higher than in previous conflicts - in Israel and worldwide - with approximately 93% survival rate compared to 85% in prior conflicts. Many individuals who would not have survived past conflicts were now reaching hospitals and, subsequently, rehabilitation centers with highly complex trauma. This shift placed an even greater burden on the rehabilitation system, which had to adapt to treating a larger number of patients with severe polytrauma, multiple amputations, and neurological impairments.

A critical factor that contributed to improved survival rates was the tactical evacuation capabilities of units such as Unit 669, heliborne combat search and rescue extraction unit. The unit successfully extracted casualties from the battlefield using ground transportation to designated helicopter landing zones, ensuring swift air evacuation to advanced medical facilities.

The majority of injured individuals were transported by helicopter, which significantly reduced evacuation time and increased survival rates by enabling faster access to life-saving interventions.

Additionally, the advanced protective gear worn by soldiers, while providing crucial defense against lethal injuries, contributed to a high incidence of limb injuries. The armor effectively shielded vital organs but left the extremities more vulnerable, resulting in a large number of severe limb wounds, including fractures, amputations, and complex soft tissue damage. In the past, many of these injuries would have been fatal. However, the improved survival rate due to the advanced protective gear meant that more individuals survived with debilitating injuries that now required specialized rehabilitation. This pattern of injuries further underscored the need for specialized rehabilitation solutions, including advanced prosthetics, robotic-assisted therapy, and tailored physiotherapy programs.

Ultimately, overcoming these rehabilitation challenges during the Iron Swords War required Israel's healthcare system to demonstrate creativity, flexibility, and rapid responsiveness. Despite the difficulties, and thanks to the dedication of medical professionals, the system succeeded in finding innovative solutions that ensured continued high-quality care. However, the recent events exposed deep structural issues that necessitate long-term reforms and improved preparedness for future emergencies.

Technological Solutions in Rehabilitation Following the Iron Swords War

The Iron Swords War led to a surge in the number of wounded individuals requiring rehabilitation, prompting the healthcare system to integrate cutting-edge technologies that enable faster, more precise, and more effective treatment. One of the key trends observed was the increased use of advanced rehabilitation technologies, including robotic-assisted therapy, 3D imaging for orthopedic reconstruction, functional rehabilitation tools, and digital assessment systems for personalized treatment planning.

Among the critical technological advancements was the introduction of Anti-Gravity Treadmills, which utilize differential air pressure technology to reduce the effective weight of the patient during rehabilitation exercises. This system allows individuals with severe lower-limb injuries to gradually regain mobility without placing excessive strain on healing tissues, thus accelerating the recovery process and minimizing the risk of secondary complications.

Another notable innovation is technology based on advanced neurofeedback designed for neurorehabilitation, which uses neurofeedback therapy to help individuals with post-traumatic stress disorder (PTSD)

personalized treatment and enhancing the precision and efficiency of medical care. The use of robotic rehabilitation, 3D printing, artificial intelligence-based systems, and remote digital rehabilitation tools has accelerated recovery and provided patients with cutting-edge treatment options that were previously available on a limited scale.

regulate their emotions responses, by monitoring and addressing abnormal I brain activity patterns associated with the condition.

Additional technological advancements introduced during the war in the battlefield include:

1. An automatic tourniquet system, improving the speed and efficiency of hemorrhage control in the field.
2. A specialized drone system designed to deliver blood units directly to the battlefield, significantly reducing delays in administering life-saving transfusions.
3. Advanced temperature regulation devices for injured individuals in the field, providing both cooling and heating as needed to stabilize patients before hospital evacuation.

In addition to the technologies already discussed, another significant advancement in the field of rehabilitation is the use of systems that monitor patients' progress in real time.

These technologies not only provide feedback to patients on whether they are performing exercises correctly, but also enable therapists to track progress remotely, offering insights into the patient's rehabilitation. This capability allows therapists to manage multiple patients simultaneously, enhancing the efficiency and reach of rehabilitation programs.

Furthermore, the use of Virtual Reality (VR) systems has significantly enhanced both physical and psychological rehabilitation. VR-based therapy provides immersive, interactive environments that encourage motor engagement while also addressing post-traumatic stress disorder (PTSD) and anxiety-related conditions in injured patients. By integrating gamified rehabilitation exercises, VR platforms improve patient motivation and adherence to therapy while enabling remote monitoring and real-time progress tracking.

Together, these technological innovations have transformed the rehabilitation landscape, offering more effective, patient-centered solutions that optimize recovery paths and enhance long-term functional outcomes. The rapid adoption of these technologies in response to the war has underscored their vital role in modern rehabilitation and demonstrated the necessity of integrating them into routine medical care.

Conclusion and Key Insights

The integration of advanced technologies in the rehabilitation process following the Iron Swords War has significantly improved the healthcare system's ability to handle a high volume of patients while providing. One key finding from the increased adoption of these technologies is their ability to enhance not only physical rehabilitation but also patients' mental well-being. Digital solutions, virtual reality programs, and AI-driven tools now offer targeted support for PTSD and emotional recovery alongside physical rehabilitation.

Additionally, changes in the injured evacuation protocol resulted in a higher ratio of wounded survivors compared to fatalities, increasing the demand for rehabilitation services. Furthermore, there was an accelerated effort to establish new rehabilitation centers, addressing existing gaps and improving preparedness for future emergencies.

The war expedited processes that would have otherwise developed gradually over years. It is now evident that integrating technological innovation into medical rehabilitation is not just a temporary necessity but a systemic transformation that redefines how severe injuries and trauma-related conditions are managed.

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