

Rehabilitation after musculoskeletal injury: Israeli and South African perspectives

Brian Bernstein, MD^{a,*}, Kirsty Berry, MD^a, Elior Moreh, MPH, MD, PhD^b, Isabella Schwartz, MD^b, Yoram A. Weil, MD^c, Lindsay Scott, BSc Physiotherapy, MSc^d, Nomalungelo Nyathi, MD^d

Abstract Rehabilitation for patients sustaining isolated and multiple musculoskeletal injuries due to trauma remains a mainstay of recovery. There are a wide variety of systems in place to manage the rehabilitation process. This article describes the post-traumatic rehabilitation procedures from 2 member countries of the International Orthopaedic Trauma Association, Israel and South Africa. The systems are reflective of the clear differences between these 2 countries with vastly different economic strata and health care systems. In Israel, the rehabilitation programs and resources are most likely the result of the mature social support systems and the trauma experience. In South Africa, the programs are reflective of a two-tier health care system, with patients exposed to varying levels of rehabilitation resources.

Keywords: rehabilitation, health care systems

1. Introduction

Rehabilitation for patients sustaining isolated and multiple musculoskeletal injuries due to trauma remains a mainstay of recovery. In the Middle East and Africa, there are a wide variety of systems in place to manage the rehabilitation process, which predictably have different states given the wide variety of geographic, cultural, and economic differences in the regions. This article describes the post-traumatic rehabilitation procedures from 2 member countries of the International Orthopaedic Trauma Association, Israel and South Africa (SA). Israel is a small country geographically and in population, with well-resourced social and health care services, including a sophisticated system. South Africa is much larger geographically, has almost 10 times the population, and is more heterogeneous. Both are not necessarily representative of other countries in the regions and have their own unique characteristics.

2. Israel

2.1. Overview

Israel is a small, developed country with life expectancy within the first decile of the modern world. Approximately 40,000 persons are injured every year in Israel, according to the National Trauma Registry.¹ The most common causes of trauma are falls (53.4%), motor vehicle accidents (MVAs, 23.3%), unintentional injuries

(18%), and intentional injuries (violence 4.4%, suicide attempts 0.5%, terrorism 0.2%, military injuries 0.1%). Nine percent of wounded people hospitalized in trauma centers are defined as severely or critically wounded. Although injuries due to terrorism and military are rare, a significantly larger percentage of individuals sustain severe and critical wounds (28% and 16%, respectively), in contrast to 15% of individuals injured in motor vehicle accidents. The mean proportion of trauma patients transferred to inpatient rehabilitation is 11.6%.² The highest proportion of transfer to inpatient rehabilitation is after falls (17.9%), because of the high incidence of proximal femoral fractures in geriatric patients.

Typically, after acute trauma, patients receive physiotherapy in the surgical ward 5 times a week, and occupational/speech therapy if needed. If deemed necessary, a social worker case manager sends the patient's file, which includes summaries of medical, psychosocial, and functional status, to be evaluated by a specialist in physical medicine and rehabilitation (PM&R). The latter determines whether the patient requires inpatient rehabilitation or one of the 3 alternative rehabilitation settings: receiving a home rehabilitation program, a multidisciplinary rehabilitation day care (in which patients come for 4 hours, 3 times/week), or in an outpatient clinic operated by health maintenance organizations (HMOs). In Israel, all citizens are provided with free universal socialized health care through one of 4 insurers known as HMOs. While there are a few stand-alone

There is no conflict of interest for any of the participating authors.

^a Department of Orthopaedic Surgery, University of Cape Town, Cape Town, South Africa. ^b Department of Physical Medicine and Rehabilitation, Hadassah Mount Scopus Medical Center, Jerusalem, Israel, ^c Department of Orthopaedic Surgery, Hadassah Ein Kerem Medical Center, Jerusalem, Israel, ^d Lindsay Scott Inc, Workability, Cape Town, South Africa

* Corresponding author. Address: Life Vincent Pallotti Hospital, Oude Molen Village, Cape Town 7405, South Africa. E-mail address: bb@otg.org.za (B. Bernstein).

Source of funding: Nil.

The study was deemed exempt from Institutional Review Board and Animal Use Committee Review.

Copyright © 2024 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of the Orthopaedic Trauma Association.

This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

OTAI (2024) e319

Received: 1 December 2023 / Received in final form: 19 December 2023 / Accepted: 22 December 2023

Published online 2 August 2024

<http://dx.doi.org/10.1097/OI9.0000000000000319>

rehabilitation hospitals with multiple departments, most rehabilitation departments are integrated within general hospitals.

Criteria for choosing between these options include severity of injury and of functional deterioration, and the resulting intensity of rehabilitation treatment needed (daily vs. 3 times a week); the need for ongoing medical and nursing care; the risk of complications if patient's compliance at home will be poor; patient's social support and conditions at home (presence of family members at home, support resources and living conditions, including the number of stairs to the house); cognitive status, regarding the patient's ability to be at home alone for a few hours; and non-weight-bearing status on 1 or 2 legs.³

2.2. Rehabilitation Program in Hospital

Inpatient rehabilitation is inherently a multidisciplinary process. The leader of the team and the case manager is a board-certified PM&R specialist. There are hundreds of PM&R specialists (a 4-year long specialty) working throughout Israel, most of them in hospitals. The rehabilitation team includes physicians, nurses, physiotherapists, occupational therapists, speech therapists, psychologists, social workers, and dietitians. After admission, the patient is thoroughly examined, considering the medical problems, drug therapy, cognitive and affective state, and the patient's functional and social condition; then, an interventional rehabilitation plan is developed. Realistic rehabilitation goals are defined in a multidisciplinary team meeting. As an example, an elderly woman with a proximal femur fracture is expected to achieve independence in basic activities of daily life, except for showering, and develop walking ability with a cane, typically after a few weeks. Whereas a young man with a severe traumatic brain injury injured following a motorcycle accident is expected at discharge to require constant supervision because of lack of judgment and, considering spastic hemiplegia, might require moving from a higher floor. Family meetings can identify issues early during hospitalization, such as the need for supervision, and change of housing.

Every week, a patient's progress is reported in a multidisciplinary meeting, and the rehabilitation plan is adjusted. The rehabilitation process includes mobilization facilitated by all staff members, physiotherapy 5 times per week (average 45 minutes per session), occupational therapy 5 times a week (average 30 minutes per session), and a psychosocial intervention by the social worker. Additional treatments include speech therapy (2–5 sessions a week), and psychological support (1–2 sessions a week) as needed. Post-traumatic symptoms are actively monitored, and if necessary, patients are referred to a psychiatric consultant who is available 5 days a week. Pain levels are assessed daily and managed by physicians, with a particular focus on gradually reducing the use of opioids as soon as feasible. The nutritional status of patients is evaluated by a dietitian who provides counseling on dietary enhancements to promote optimal wound and bone healing, as well as rebuilding muscle mass. Repeated X-rays or scans are conducted as required, and orthopaedic surgeon consults are ordered to determine the appropriate weight-bearing status for fractured limbs. Patients in need of a prosthesis or an orthosis are evaluated by a therapist specialized in orthoses; consultations for spasticity are also available. Standard assessments include⁴ functional index measurement (FIM)⁵ close to admission and before discharge, screening for depression,⁶ screening for delirium⁷ administered in 3 days after hospitalization after NOF, and assessment of the risk of neglect/abuse.

There are specialized rehabilitation programs for specific injuries: Brain injury rehabilitation emphasizes cognitive treatment, aside from psychological treatment, and social worker support to the patient and family; spinal cord injury rehabilitation emphasizes sphincter rehabilitation, independence from wheelchair, and mobility; orthopaedic injury rehabilitation focuses on preservation of ranges of motion, mobilization, and gradual weight-bearing as allowed—in hydrotherapy, antigravity devices, and on the ground. Dedicated departments provide rehabilitation to the pediatric and geriatric populations.

Preparation for discharge from the ward begins at the early stages of hospitalization. It includes interaction with relevant community services to adjust living conditions, nursing help, and ongoing rehabilitation at home/ambulatory facilities. Most patients are discharged when the following goals are achieved: independence using accessories in passageways, and mobility and independence in toileting, or when the patient reaches a plateau based on the FIM.

2.3. Conclusion/Future Directions

Rehabilitation after trauma often requires a multidisciplinary process in hospital. Functional goals differ between patients according to personal factors such as previous functional level, housing conditions, and occupation. Hospitalizations last about a month on average.⁸ Improving multidisciplinary rehabilitation at home in the future will alleviate waiting lists for inpatient rehabilitation.

3. South Africa

Inpatient management and rehabilitation after a trauma injury follows international standard guidelines; however, the practical delivery differs depending on the hospital and resource availability. South African health care has evolved into a two-tier system with a public health sector and a private (insured) health sector, with differing access to funding and resources.

3.1. Overview: Return-to-Work Programs for Work-Related Injuries

Work disability (WD) is when an employee with a health condition is temporarily or permanently not able to return to or remain in work or, when at work, they work at a reduced productivity level.⁹ Effective return-to-work (RTW) rehabilitation for the prevention and reduction of WD depends on the relationship between many stakeholders, namely the injured person, the health care team, the employer, and the insurance systems, all within the context of the local sociopolitical environment.⁹

South Africa, as a middle-income country, has inherent contextual issues that influence the implementation of RTW solutions, such as a high unemployment rate, low work-skill level, and a disjointed health care system.¹⁰ South Africa's two-tiered health care system has 17% of patients paying for private health coverage and 83% relying on the public health system, with differing resources, leadership, and quality.¹¹

South Africans who are in formal employment (around 26.5% of total population) who sustain a work-related injury can access the private health sector under the Compensation of Occupational Injuries and Disease Act (COIDA). The injury sustained will be described using an ICD 10 code, and from there, the health care professionals are paid a fee for service for the medical

management of the impairment.¹² This biomedical approach unfortunately remains core in many South African insurer and compensation policies and procedures, focusing on acute post-trauma management and largely ignoring the multistakeholder management needed for the reduction of work disability.^{13,14} This tide is changing as an amendment to the COID Act, signed into law in April 2023, provides for the inclusion of rehabilitation, reintegration, and return to work of injured employees.^{15,16} Therefore, there is now an urgent need to establish and implement evidence-based RTW programs to support the legislative changes and align all stakeholders to reduce the burden of work disability on the country.^{10,16}

3.2. Rehabilitation Program Details

The contextual differences between countries mean that it is unlikely that there will be a gold standard program that can be implemented globally; therefore, local research and implementation of RTW rehabilitation models is needed to support South Africa's amendment to the COID Act.¹⁶ The dearth of such programs in SA allows for the description of a RTW program for patients with work-related musculoskeletal injuries that has recently been described in a Masters' study of one of the authors. This program, referred to as WRAP (Work Rehabilitation and Assistance Program), is a comprehensive value-based health care (VBHC) program with a clear delivery model, evidence-based protocols, entry and exit criteria, a clear reimbursement model, and well-defined outcomes delivered over a defined period. The WRAP has produced outcomes that are valuable to patients, health care providers, and the employer. The core protocols include stratification with matched intervention and collaborative decision making. The outcomes measured at baseline and discharge focus all stakeholders on the value added by measuring the reduction in work disability. The program includes all 3 intervention domains that were found in a systematic review to be effective, namely health-related, work-related, and service coordination interventions.¹⁷ Administrative, clinical, and reporting protocols are centralized and embedded into an information technology management system (ITMS), and all therapists delivering this RTW program are trained on the program and ITMS protocols.

3.2.1. Health Care Delivery Centers. The national network of centers that deliver WRAP are outpatient centers that combine physiotherapy and occupational therapy equipment in interview, treatment, exercise, education, and work simulation areas.

3.2.2. Rehabilitation Team. The medically stable patient is referred to the WRAP either directly from a trauma unit or by a specialist after discharge from hospital. The core interdisciplinary rehab team consists of a physiotherapist and an occupational therapist, who collaborate with the referring doctor, workplace doctor, and other allied professionals. The current biomedical payment structure limits the inclusion of the services of other key team members, such as a psychologist and a social worker.

3.2.3. Standard Assessments. RTW programs need to shift stakeholders' focus away from the measurement of only medical impairments, toward outcomes that quantify the burden of work disability in terms of work functioning, lost work time, and cost.¹⁷ As per the VBHC model, if all stakeholders have insight into the patient-centered goals and outcomes of the interventions, the

outcomes will improve and costs will reduce.¹⁸ The therapists in this program assess not only the patient's physical, psychosocial, and baseline work function but also the job tasks, possible accommodations, and workdays missed and information from the multidisciplinary team relating to planned interventions. The assessment needs to be holistic to efficiently align the patient, workplace, and health care providers to the same RTW goals. In their assessments, the therapists need to include the potential insurance or legislative complicating factors that may be important in RTW planning.

3.2.4. Additional Patient Support. In South Africa, the cost of and access to transport is a barrier to health care access. Therefore, the program offers the patient free access to transport to attend rehabilitation therapy, as may be required. Referral to additional services not covered by the COID Act is facilitated by the rehabilitation team. These include referral to public health clinics for the management of comorbidities, such as hypertension and diabetes.

3.3. Conclusion/Future Directions

RTW rehabilitation programs have an important part to play in reducing the growing burden of work disability resulting from work-related musculoskeletal injuries. This complex area of work disability can be simplified by introducing technology to support the administrative processes and to give transparency of process and outcome reporting to the multiple stakeholders. A RTW rehabilitation program that can stratify, coordinate, intervene, and measure both the health and work-related outcomes can inform practice to reduce the cost of work disability for employees with work-related musculoskeletal injuries in South Africa.

The South African Compensation Fund pays siloed health care providers a fee for service. The South African government, through a recent inquiry report, strongly encouraged movement away from this form of remuneration because it disincentivizes coordinated care, promotes oversupply, and does not traditionally encourage the management of the non-medical factors that promote disability.^{9,19} Consultation on the intervention cost of RTW programs is recommended to inform alternative, outcome-based reimbursement models.

4. Conclusion

Rehabilitation after a traumatic event remains a crucial aspect of the recovery process and is always multifactorial in access and delivery. The economy and the incumbent health care system of every country, combined with personnel and facility resource availability, will dictate the access and ability to deliver adequate rehabilitation. A national government's commitment to provide the needed resources will be critical to the result, as is seen in Israel. The South African experience is fragmented as it emerges as a society grappling with inequality and the conflict between a capitalist and socialist system with an attempt at finding a social compact. As is often the case in health care delivery, the practitioners treating patients are finding innovative solutions and engaging with the authorities on all sides of the political divide to provide the needed care. Both countries involved in this combined review experience a high trauma load, almost epidemic in proportion, and the recognition of this should be used to improve and advocate for the resource allocation required.

References

1. The National Center for Trauma and Emergency Medicine Research. *Gertner Institute for Epidemiology and Health Policy and Israeli Ministry of Health National Report on Trauma 2000-2019*. Israeli Ministry of Health; 2021:43–44.
2. The National Center for Trauma and Emergency Medicine Research. *Gertner Institute for Epidemiology and Health Policy and Israeli Ministry of Health. National Report on Trauma 2010-2015*. Israeli Ministry of Health; 2016:43.
3. *Israeli Ministry of Health Circular Number 04/2009, 2009 (Hebrew)*. Available at: [MicrosoftWord-mr04_2009.doc\(health.gov.il\)](#). Accessed May 30, 2023.
4. *The National Program for Quality Indicators in Israel*. Israeli Ministry of Health; 2022 Available at: [MicrosoftWord-QualityIndicators2013-2021executivesummary_V2-FINAL\(www.gov.il\)](#). Accessed May 30, 2023.
5. Keith RA, Granger CV, Hamilton BB, et al. The functional independence measure: a new tool for rehabilitation. *Adv Clin Rehabil*. 1987;1:6–18.
6. Kroenke K, Spitzer RL, Williams JB. The Patient Health Questionnaire-2: validity of a two-item depression screener. *Med Care*. 2003;41:1284–1292.
7. Inouye SK, van Dyck CH, Alessi CA, et al. Clarifying confusion: the confusion assessment method. A new method for detection of delirium. *Ann Intern Med*. 1990; 113:941–948.
8. Barnea R, Weiss Y, Abadi-Korek I, et al. The epidemiology and economic burden of hip fractures in Israel. *Israel J Health Pol Res* 2018;7:38.
9. Loisel P. *Developing a New Paradigm: Work Disability Prevention*; 2009. Available at: <http://www.occhealth.co.za/?/viewArticle/1052>. Accessed October 21, 2021.
10. Ketzi N. *The Return-To-Work Policy for Injured and Diseased Workers*; 2018. Available at: <http://vital.seals.ac.za:8080/vital/access/manager/PdfViewer/vital:31307/SOURCE1?viewPdfInternal=1>. Accessed: November 12, 2022.
11. Mathews C, Goga A, Loveday M, et al. Moving towards universal health coverage: strengthening the evidence ecosystem for the South African Health System. *South Afr Med J*. 2019;109:8–14.
12. COIDA. *South African Government Let's Grow South Africa Together, No. 130 of 1993: Compensation for Occupational Injuries and Diseases Act, 1993*. Government Gazette; 1993. Available at: https://www.gov.za/sites/default/files/gcis_document/201409/act130of1993.pdf. Accessed October 29, 2022.
13. Martins AI, Rosa AF, Queirós A, et al. Definition and validation of the ICF—usability scale. *Procedia Comput Sci*. 2015;67:132–139.
14. Palmer M, Harley D. Models and measurement in disability: an international review. *Health Policy Plan* 2012;27:357–364.
15. Mosidi L. *Rehabilitation—ASPASA, The COID Amendment Bill*. Compensation Fund; 2019. Available at: <http://aspasa.co.za/wp-content/uploads/2019/02/MHSC-Occupational-Health-Safety-Summit-Rehabilitation-19-Oct-2018.pdf>. Accessed October 30, 2022.
16. Olivier M, Govindjee A, Cheong E, et al. Return-to-work and Disability Management in the Developing World: Developments in South Africa and Malaysia, with Reference to the UN Convention on the Rights of Persons with Disabilities and Comparative Precedents. *Research Report Prepared for the Compensation Fund of South Africa*; 2012.
17. Cullen K, Irvin E, Collie A, et al. Effectiveness of workplace interventions in return-to-work for musculoskeletal, pain-related and mental health conditions: an update of the evidence and messages for practitioners *J Occup Rehabil* 2018;28:1–15.
18. Kaplan R, Porter M. How to solve the cost crisis in health care. *Harv Bus Rev*. 2011:47–64.
19. *Health Market Inquiry*. Competition Commissioner; 2019. Available at: https://www.hfassociation.co.za/images/docs/HMI_Executive-Summary.pdf. Accessed November 20, 2021.