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Trauma center rehabilitation systems in Latin America

Luis G. Padilla-Rojas, MD, PhD, FIOTA[a,*], Johnatan Tamayo-Cosio, FTL[b], Darío E. Garín-Zertuche, MD, PhD, FIOTA[c], Christian A. Rojas-Herrera, MD[d], Linda Vallejo, MD[e], Jaime A. Leal, MD[f], José O. Soarez-Hungria, MD, PhD[g], Marcelo T. Caiero, MD, PhD[h], Horacio Tabares-Neyra, MD[i], Jorge L. González Roig, MD[j], Vincenzo Giordano, MD, PhD, FBCS[k,l]

Abstract Trauma is a leading cause of mortality and morbidity worldwide with high rates of disability in survivors. With improvements in care, rehabilitation of the trauma patient is a cornerstone to reducing sequelae. A lack of well-established hospital rehabilitation units and standardized protocols for managing posttraumatic injuries is a common problem in Latin American countries. Future studies should seek to understand the barriers and gaps in care so that consensus and ultimately best practice guidelines can be developed and included in rehabilitation programs throughout trauma centers in Latin America.

Keywords: rehabilitation, trauma systems, rehabilitation protocols, physiotherapy, rehabilitation services

1. Introduction

Trauma is a leading cause of mortality and morbidity worldwide and thus represents a great global health challenge. The World Health Organization (WHO) estimated that 9% of deaths worldwide result from trauma. In addition, approximately 100 million people are temporarily or permanently disabled every year.

Throughout the years, a decreasing trend in mortality rate has been demonstrated in patients suffering from severe trauma. This increases the relevance of documentation of other outcomes for this population, including patient-reported outcome measures, such as health-related quality of life (HRQoL). The instrument that is used most frequently to assess HRQoL in patients suffering severe trauma is the SF-36 questionnaire, and 10 of the 36 items evaluated are related to mobility, highlighting the importance of rehabilitation and physical therapy invaluable tools to improve life after trauma.

In a hospital inpatient setting, there is evidence that rehabilitation after surgery, including polytraumatized patients, has improved the results when delivered by a multidisciplinary team and supervised by an appropriate medical specialist. In addition, a substantial number of patients admitted to the ICU because of an acute illness or severe trauma will develop a de novo form of muscle weakness during the ICU stay that is referred to as "intensive care unit acquired weakness" (ICUAW). The cornerstone of preventing ICUAW includes medical management (eg, aggressive treatment of sepsis, preventing hyperglycemia with insulin, and avoiding using parenteral nutrition) and early mobilization during the first week of critical illness. The Level 1 trauma center's integrated program includes an excellent prehospital unit, emergency and trauma resuscitation unit, dedicated trauma intensive care unit (TICU), and rehabilitation unit.

This a review of the rehabilitation trauma centers in 4 representative countries in Latin America: Mexico, Colombia, Brazil, and Cuba.

2. México

2.1. Overview

The development of physiotherapy in Mexico has been marked by a set of historical events and phases, setting the stage for its

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[a] Mexican Federation of Orthopaedic and Traumatology FEMECOT International Committee Chair, Metropolitana de Guadalajara University, Puerta de Hierro Hospital, Guadalajara, Jal. México, [b] Director of CORE Rehabilitation and Physiotherapy Center, Professor Madrid School of Osteopathy Campus Mexico, Guadalajara, México, [c] Mexican Federation of Orthopaedic and Traumatology FEMECOT President, Autónoma de Baja Californa University. Angeles Hospital, Tijuana, BCN, México., [d] San Rafael Hospital, Orthopaedic Department, Tunja, Colombia., [e] Mayor Mederi University Hospital, Police Hospital, San José Infantil Hospital, Bogotá, Colombia., [f] Mayor Mederi University Hospital, La Samaritana University Hospital, Bogotá, Colombia., [g] Grupo de Trauma Ortopédico, Santa Casa de São Paulo, São Paulo, Brazil, [h] Instituto de Ortopedia e Traumatologia, Hospital das Clinicas HCFMUSP, Faculdade de Medicina, Universidade de Sao Paulo, São Paulo, Brazil., [i] Cuban Orthopedics and Traumatology Society President, Head of the Surgical Department of the Center for Research in Longevity, Aging and Health (CITED), La Havana, Cuba., [j] Cuban Society of Physical Medicine and Rehabilitation President, La Havana, Cuba., [k] Serviço de Ortopedia e Traumatologia Prof. Nova Monteiro, Hospital Municipal Miguel Couto, Rio de Janeiro, Brazil, [l] Ortopedia, Clínica São Vicente, Rede D'or São Luiz, Rio de Janeiro, Brazil.

** Corresponding author. Address: Mexican Federation of Orthopaedic and Traumatology FEMECOT International Committee Chair, Metropolitana de Guadalajara University, Puerta de Hierro Hospital, Av Empresarios 150-903, Col Puerta de Hierro, Zapopan 45116, Jal. México. E-mail address: lupadilla@gmail.com (L. G. Padilla-Rojas).*

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emergence particularly in the past 2 decades. The Children's Hospital of Mexico "Federico Gómez" was the first institution to offer specialized courses in physical and occupational therapy. Since its opening on April 30, 1943, it has had a rehabilitation service operated by physicians. In 1980, the Adele Ann Yglesias School of Physical Medicine obtained the Official Validity Registry (REVOE), with which it became the first Mexican school to offer a bachelor's degree in Physical Therapy and Rehabilitation.[1]

Health services have to adapt to increasingly expensive medical conditions that lead to a loss of functional capacity through cost-effective and high-quality standards. Fragility fractures are one example of these conditions. In Mexico, currently the population of adults older than 60 years is 10.4 million. It is expected that by 2050, this figure will increase to 36.4 million with life expectancy increasing to 82 years.[2] Because of this, it is expected that the incidence of fragility fractures will continue to increase.

In Mexico, physical rehabilitation has become a pillar of care for patients with musculoskeletal disorders. Rehabilitation is widely recognized as essential for the recovery process after musculoskeletal injuries, focusing on improving mobility and enhancing self-care skills.[3] Early physiotherapy occurring within 48 hours of the postoperative period is recommended, with continuous supervision by a physiotherapist. Weight-bearing is encouraged as soon as possible after surgery.[4] The improvement of limb stability is supported by direct recruitment of the flexor and extensor muscles, and specific neuromuscular proprioceptive rehabilitation exercises are particularly suitable for these muscles.[5] Rehabilitation objectives include reducing pain, edema, and increasing range of motion. Physiotherapy intervention in these patients can reduce complications derived from pathology and periods of immobilization such as joint stiffness, muscle atrophy, and residual joint deformity.[6]

2.2. Rehabilitation Services in Mexico

Rehabilitation plays an essential role in the recovery process of hospitalized patients. Programs are designed to help individuals restore their functionality and improve their quality of life after injury, illness, or surgery. Specifically designed to address the individual needs of each patient, a multidisciplinary team of therapy specialists may include physical, occupational, speech, respiratory, and psychological therapists. There are multiple institutional providers of rehabilitation services in Mexico.

The most important institutional provider of rehabilitation services is the Mexican Institute of Social Security (Instituto Mexicano del Seguro Social or IMSS). IMSS, a government organization, is an essential part of the Mexican health care system and has facilities throughout the country that include 3 third-level care units, one second-level unit, 19 rehabilitation services within highly specialized medical units, and 112 rehabilitation services in area and regional general hospitals. In the rehabilitation units and services located on the second-level and third-level hospitals, there are programs for the training of Physician Specialists in Physical Medicine and Rehabilitation and physical and occupational therapy schools. In June 2005, the IMSS began the implementation of rehabilitation services at the first level of care (family medicine units), which represented an innovative project for the system. Each unit consists of a physician specializing in physical medicine and rehabilitation (PM&R), 4 physical therapists, a social worker, and a nurse. There are currently 49 services in operation throughout the country, which have resulted in an increase in the capacity of rehabilitation services by more than 40%.

The Mexican Institute for Social Security and Services for State Workers (Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado or ISSSTE) is another federal government organization and provides assistance for disability to federal workers. ISSSTE, for its part, has a national network of rehabilitation services, headed by the "20 de Noviembre" Medical Center and the "1.◦ de Octubre" Regional Hospital. Another system, the system for the Integral Family Development (Desarrollo Integral de la Familia, DIF), a government agency for the underprivileged adults and children, also offers rehabilitation services. A strength of DIF is the Community-Based Rehabilitation Program, with more than a 1000 Basic Rehabilitation Units throughout the country.

In addition, there are rehabilitation services in institutions such as PEMEX and the medical services of the Armed Forces and the Navy.[7] These units have specialized departments in traumatology and orthopaedics; however, they are not exclusive for patients recovering from traumatic injuries.

2.3. Clinical Practice Guidelines

In general, medical practice guidelines provide recommendations based on up-to-date scientific evidence on the treatment of various medical conditions and represent an important tool for standardizing and improving the quality of medical care. Currently, there are no specific medical practice guidelines for hospitalized polytraumatized patients that include well-defined rehabilitation protocols. This could be due to several factors that include the lack of resources, time, and collaboration among experts in the area. In the absence of specific medical practice guidelines, there are inevitable institutional and individual variabilities in the rehabilitative approaches to hospitalized polytrauma patients. There are therefore clear opportunities for the evaluation of best practices, development of consensus approaches, and creation of universally accepted guidelines. Overall, however, the progressive interdisciplinary approaches employed in many centers during the preoperative and post-operative phases has contributed to improving patient morbidity and mortality after traumatic injuries.[7]

3. Colombia

3.1. Overview

The rise of physiotherapy in Colombia arose in the 1940s after the Second World War and the polio epidemic, although some scattered precursor practices of rehabilitation were already being carried out.[8] Subsequently, the field gained greater importance as a paramedical branch that was oriented to the recovery of movement of convalescent patients with musculoskeletal injuries, with the development of a related therapeutic technical career after 2 years of training.[9] At its inception, physiotherapy was based entirely on the North American model as a technical discipline. By the beginning of the 21st century, the discipline became more professionally stringent, with increased training requirements, expanded scope, and diversified therapeutic interventions.[10]

The approach to physiotherapy in the Colombian health system has corresponded with a reductionist biomedical model. This model is based on the needs of the patient and includes a series of interventions aimed at meeting the objective of treating

conditions, favoring correction or adaptation of the body against the loss of capacity.[11] In the past 10 years, a second dimension has been added, which focuses on the prevention and maintenance of health and follows the conceptual model outlined in the World Health Organization's International Classification of Functioning, Disability, and Health.[10,12] Additional emphasis has been placed on the complementary spheres of human well-being, such as education, recreation, social welfare, and industry; although these are not necessarily an integral part of the traditional medical management of patients with injuries of the musculoskeletal system, they do form part of the holistic approach that is the trend in the current health system.[13]

Colombian legislation guarantees that people with any type of disability, including posttraumatic disabilities, have access to rehabilitation care. Different laws regulate the role of rehabilitation centers and the physiotherapy profession in the country.[14–17] However, care within the Colombian health system is fragmented into various Benefit Plan Administration Companies (EAPBs). As of May 2023 and in accordance with the Colombian Health Superintendence, there are 28 EAPBs, each with its own care network.[18]

Currently, there are only 2 clinical practice guidelines (CPGs) issued by the Ministry of Health (MinSalud) and Colciencias that are aimed at trauma patients, in addition to other guidelines published by Universities.[19–22] There are no comprehensive guidelines or protocols that address issues related to trauma recovery beyond physical rehabilitation, such as the psychological or social recommendations.

3.2. Rehabilitation in Large Cities and in the Rest of the Country

Although disability in Colombia is of great social and economic concern, there are no specific national data on the subject. However, according to a 2018 national census, accidents and violence correspond with approximately 15% of the country's total disability cases.[23] Historically, the gap between the supply of health services provided in large cities and the rest of Colombia is large, with discrepancies that include the availability of professionals and economic, geographical, and infrastructure conditions.[24] Cities such as Bogotá, Medellín, Cali, and Barranquilla account for 28% of the Colombian population, which is mostly urban, and at the same time, possess the greatest aggregate of resources and health offerings, with high-tech physical rehabilitation centers, trained personnel, home services that include physical and occupational therapy, sports rehabilitation centers, hydrotherapy, and availability of orthoses and prostheses.[25] Despite these differences, Colombian health system administrative barriers and poor patient access to services such as physical therapy remain major areas of concern.

Patients in small municipalities or rural areas, which represent 50% of the 1100 municipalities in the country, have significant problems accessing rehabilitation programs, with up to 52% unable to access these programs despite having a medical order to initiate therapy and 80.4% unable to continue current treatment due to administrative delays, appointment delays, and a lack of personnel.[26] This lack of access can exacerbate musculoskeletal problems that would benefit from early therapy and alter management protocols, leading to a higher prevalence of joint stiffness, complications of injuries in skin, vascular changes, joint collapse due to early support, and lameness.[27] The poorer populations often resort to alternative traditional medical treatments to improve mobility and proprioception, including ointments and artisan remedies, walking on uneven terrain, and daily activities such as cooking.[28] In response to this situation and to the Convention on Persons with Disabilities and its Statutory Law 1618 of 2013, the Ministry of Health has been advancing support to strengthen, expand, and sustain rehabilitation services in low and medium complexity institutions.[29]

The rehabilitation of patients with musculoskeletal trauma and polytrauma in Colombia depends on many variables beyond the strictly medical ones. These variables include authorization administration, availability, accessibility, insurance coverage, presence of an EAPB care network, and the geography. Patients with financial capacity often opt to start their rehabilitation in a private system, pending insurance approval. Given the current rehabilitation challenges and barriers, instructions given by the treating orthopaedic surgeon are of great importance for the initiation of therapy, with instructions and exercises that patients can follow and use at home.

4. Brazil

4.1. Overview

In Brazil, there are no standardized postoperative rehabilitation protocols for patients who have suffered fractures, regardless of whether their treatment is nonsurgical or surgical, age group, or need for special care, such as recovery hospitals for seriously traumatized or geriatric patients. On the country's Ministry of Health website, where the last available file dates are from 2018, the only existing guideline addresses the diagnosis, treatment, and rehabilitation of femoral neck fractures in the elderly.[30] Owing to the lack of a national recommendations, several public and some private institutions have their own guidelines. Some of these have been published in the literature, mostly in physical therapy journals that are generally not indexed with the most popular databases. In any case, these publications favor the dissemination and encourage the implementation of rehabilitation protocols in other health units. In this section, we aim to present a review of the commonly used protocols for the rehabilitation of fractures and dislocations of the shoulder girdle, upper limbs, pelvis, and lower limbs in Brazil.

4.2. Shoulder Girdle and Upper Limb

There is no uniform protocol for the rehabilitation of shoulder girdle and upper limb traumatic injuries, even the most common ones, such as acromioclavicular dislocations, proximal humerus fractures, and distal radius fractures. In this context, one of the most interesting protocols found in the literature is that of the Physiotherapy Sector of the Faculty of Medicine of Ribeirão Preto, University of São Paulo (USP).[31] For proximal humerus fractures treated with open reduction and internal fixation (ORIF), regardless of the use of a nonblocking or locked plates, the protocol starts on the first postoperative day in the hospital with daily sessions and lasts for 12 weeks, with progressive increase in mobility and inclusion of strength exercises from the sixth to the eighth weeks. Active and passive exercises are started early for the shoulder, always respecting the pain threshold, as well as active exercises for the other joints of the affected upper limb. The use of a sling is recommended as protection when the patient leaves the house. Full weight-bearing, with resistance exercises for the shoulder and shoulder girdle, is permitted only after 12 weeks, when proprioception and plyometric exercises are also included. This protocol was later validated and published by

Barbosa et al in Brazilian journals.[32,33] According to the same guidelines, distal radius fractures treated with ORIF with plates, patients begin active range-of-motion (ROM) exercises for the wrists and fingers. Passive mobilization exercises are designed to help gain wrist and finger ROM, mainly with intrinsic hand strengthening exercises. Patients are encouraged to use their hands for light activities, and limb elevation is performed to control local edema. After 4 to 8 weeks, active exercises for the entire limb are initiated, with strengthening of the wrist extensors and flexors.[31] The same protocol is applied for patients treated nonsurgically with a cast when immobilization is discontinued.

Arliani et al[34] evaluated the conduct and procedures performed by 122 Brazilian orthopaedic surgeons in the rehabilitation of acromioclavicular dislocations. They found no consensus on the rehabilitation of these injuries as well as lack of uniformity in terms of the period of immobilization after surgery (67.2% of surgeons keep a sling for 3 to 6 weeks) and the return to sports activity. In a recent publication, Giordano et al.[35] introduced an accelerated postoperative rehabilitation protocol for anterior rim glenoid fractures treated with ORIF. Rehabilitation began on the first postoperative day, including passive external rotation exercises and active-assisted flexion, adduction, and abduction exercises as tolerated. The exercises are performed with the patient sitting or lying down. Phase 1 is continued for 6–10 weeks until the patient regains painless, normal, or near-normal ROM. Usually by 10 weeks, the fracture and labrum are healed, so phase 2 rehabilitation begins with strengthening and ROM exercises. The accelerated postoperative rehabilitation protocol, which provides for immediate passive external rotation of the operated shoulder, has proven a nonsignificant loss of ROM compared with the contralateral side.

4.3. Pelvis and Lower Limb

There is no uniform protocol for the rehabilitation of pelvic and lower limb fractures, except for the proximal femur in the older population.[30] For proximal femur fractures, according to this guideline, physiotherapy should be started early (within 48 hours of the postoperative period), in a hospital setting, with continuity and supervised by a physiotherapist. It is recommended that the regular physical therapy program is performed either at home or in an outpatient setting, shortly after hospital discharge. Nutritional support is recommended, particularly for patients who have inadequate nutritional intake. This protocol was recommended by Queiroz et al.[36] in the Brazilian Journal of Orthopaedics. Of interest, in a systematic review by Carneiro et al.,[37] no standardized physiotherapeutic treatment was found for older patients in the postoperative period for proximal femur fractures. Although there is a belief that strengthening exercises are important for the functional improvement of these patients, evidence shows that there is no guarantee that the patients will return to their prefracture functional state. In the Brazilian literature, no other standardized protocols were observed for any traumatic injuries of the pelvis or other anatomical regions of the lower limbs, only case reports of isolated experiences or systematic reviews of studies published by North American, Canadian, and European authors.

It is quite clear that there is a great need for the development and implementation of standardized and reproducible protocols for the postoperative treatment of fractures in Brazil. This should be primarily conducted by the Brazilian Ministry of Health, with the support of health institutions with wide academic recognition, as University of Sao Paulo (USP) has been doing this in isolation to date.

Even knowing that traumatic injuries of the upper limbs strongly compromise activities of daily living and often lead to disability and absence from work,[38] there are few established and validated rehabilitation protocols in Brazil. The same situation exists with lower limb injuries, although there is a robust literature showing that adequate rehabilitation after hip fracture surgery, particularly for older and geriatric patients, can shorten the length of hospital stay and improve clinical outcomes.[39] Future studies should seek to understand the barriers and gaps so that consensus can soon emerge on the components of comprehensive rehabilitation programs, including those in the public sector, where up to 70% of the population (approximately 150 million people) is totally dependent on the public health system.[40] Studies with an adequate level of evidence can serve as a basis for the Brazilian Ministry of Health to define guidelines for traumatic orthopaedic injuries.

5. Cuba

5.1. Overview

In 2002, the remodeling of physiotherapy facilities and construction of others in Cuba was part of the solution to provide rehabilitation coverage to the entire primary health care population. By the end of 2003, 82 such rehabilitation units were finished.[41] In 2004, intense work was done to complete the renovations to the rest of the rehabilitation facilities in the country. This construction project was performed in an effort to implement a novel integration of rehabilitation services, which is not well described in the literature. The new services have 4 essential characteristics.[42,43]

There are several scientific and social studies that support the integration of rehabilitative services. One study is the disability study, which provided an example of coordinated participation of the different political, scientific, and social factors, with wide participation. In this study, it was possible to enter the entire population of people with disabilities in Cuba in a registry, providing a special tool for Cuban professionals.[42] Through this project, data on the number of patients, type of disability, patient distribution by province, sex, and age are available. These data provide valuable epidemiological material to assist in the implementation interventions to improve patient outcomes.

To achieve a goal of providing the best care possible, the implementation of new techniques and technologies is necessary. Academic exchanges with individual professionals and international entities remain critical. These exchanges have improved significantly in recent years, supported through national and international scientific events that allow for an exchange of knowledge. Visiting foreign specialists has provided valuable knowledge. In the future, in addition to the regional events, we hope to hold global events in the field of rehabilitation.[44,45]

6. Conclusion

A lack of well-established hospital rehabilitation units and standardized protocols for managing posttraumatic injuries is a common problem in Latin American countries. The majority of patients access rehabilitation services through public health institutions. Although challenging, there are many opportunities for improvement in the delivery of rehabilitation care in the region. Future studies should seek to understand the barriers to

and gaps in care so that consensus and ultimately best practice guidelines can be developed and included in rehabilitation programs throughout trauma centers in Latin America.

References

1. Suárez Bonilla X, Rodríguez Pérez ME. Surgimiento de la fisioterapia en México a partir de la rehabilitación durante el siglo XX. *Investig Educ Méd*. 2022;11:108–120.
2. Enrique R, Manuel J, Hernández S, et al. Tratamiento de la fractura de cadera en México: el papel del manejo multidisciplinario y la Fragility Fracture Network. *Ortho Tips*. 2019;15:96–104.
3. Rojas LGP, Hernández SQ, Ávila JMJ, et al. Hip fracture care—Latin America. *OTA Int*. 2020;3:e064.
4. Romero Pisonero E, Mora Fernández J. Rehabilitación geriátrica multidisciplinar en el paciente con fractura de cadera y demencia. *Rev Esp Geriatr Gerontol*. 2019;54:220–229.
5. Thomas D, Zanin D. Rehabilitación de la muñeca lesionada. *Kinesiterapia Medicina Física*. 2020;37:1–17.
6. Zapata F, Silva A, Carolina G, et al. Fractura de muñeca en el adulto y edad pediátrica. *Diagnóstico Trat Cuid Postquirúrgicos Rehabil*. 2023;7: 415–431.
7. Meza-Ontiveros JR, Pedroza-Morán YG, Villanueva-Acosta CM, et al. El fisioterapeuta en la Unidad de Terapia Intensiva: impacto de su intervención en la fuerza muscular del paciente críticamente enfermo. *Lux Médica*. 2018;13:11.
8. Landinez N. Fisioterapia en la Universidad Nacional de Colombia: medio siglo liderando la formación de profesionales y el crecimiento profesional en torno al movimiento corporal humano. *Rev La Fac Med*. 2016;64:7.
9. Herrera Villabona E, Rocío L, Celis R, et al. Evolución histórica de la fisioterapia en Colombia y en la Universidad Industrial de Santander. *Salud UIS*. 2004;36:21–31.
10. Ministerio de Salud y Protección Social. *Perfil Profesional Y Competencias del Fisioterapeuta en Colombia*. Bogotá: Portal único del Estado Colombiano; 2015. Availabe at: https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/VS/TH/Perfil-profesional-competencias-Fisioterapeuta-Colombia.pdf. Accesed May 25, 2023.
11. Bispo Júnior JP. La fisioterapia en los sistemas de salud: marco teórico y fundamentos para una práctica integral. *Salud Colect*. 2021;17:e3709.
12. Robayo AL. Fisioterapia na Colômbia. *Fisioter Pesqui*. 2019;26: 218–219.
13. Ministerio de Salud y Protección Social. *El aseguramiento en cifras: Procedimientos de Salud Mental y Terapias en el Sistema General de Seguridad Social en Salud – Régimen Contributivo 2012 -2013. Bol Mens No 3*. Bogotá: Portal único del Estado Colombiano; 2015. Available at: https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/VP/RBC/boletin-el-aseguramiento-en-cifras-salud-mental.pdf. Accesed June 5, 2023.
14. Congreso de Colombia. *Ley 1618 de 2013 - Por medio de la cual se establecen las disposiciones para garantizar el pleno ejercicio de los derechos de las personas con discapacidad*. Bogotá: Diario Oficial de Colombia; 2013. Available at: https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/DE/PS/documento-balance-1618-2013-240517.pdf. Accessed June 5, 2023.
15. Congreso de Colombia. *Ley Estatutaria 1751 de 2015 - Por medio de la cual se regula el derecho fundamental a la salud y se dictan otras disposiciones*. Bogotá: Diario Oficial de Colombia; 2015. Available at: https://www.minsalud.gov.co/normatividad_nuevo/ley%201751%20de%202015.pdf. Accessed June 5, 2023.
16. Ministerio de Salud. *Resolución número 196 de 2002 - Por la cual se dictan las normas técnicas, científicas y administrativas para el funcionamiento de los centros de atención, tratamiento y rehabilitación integral, que prestan servicios de salud a personas con problemas asociados al consumo de sustancias psicoactivas y se dictan otras disposiciones*. Bogotá: Portal único del Estado Colombiano; 2002. Available at: https://www.minsalud.gov.co/Normatividad_Nuevo/RESOLUCI%C3%93N%200196%20DE%202002.pdf. Accessed June 5, 2023.
17. Congreso de Colombia. *Ley 528 de 1999 - Por la cual se reglamenta el ejercicio de la profesión de fisioterapia, se dictan normas en materia de ética profesional y otras disposiciones*. Bogotá: Diario Oficial de Colombia; 1999. Available at: https://www.mineducacion.gov.co/1621/articles-105013_archivo_pdf.pdf. Accessed June 2, 2023.
18. Semana R. *Estas son las EPS que más reclamos han recibido en 2023*. Bogotá: Según la SuperSalud; 2023. Available at: https://www.semana.com/salud/articulo/exclusivo-estas-son-las-eps-que-mas-reclamos-han-recibido-en-2023-segun-la-supersalud/202307/. Accessed June 02, 2023.
19. Rubiano AM, Tejada PA, Domingo J, et al. Guía de práctica clínica para el diagnóstico y tratamiento de pacientes adultos con trauma craneoencefálico severo. *Sistema General de Seguridad Social en Salud*. Vol. 30. Bogotá: Ministerio de Salud y Protección Social-Colciencias; 2014:35–50.
20. Ministerio de Salud y Protección Social. *Guía de práctica clínica para el diagnóstico y tratamiento preoperatorio, intraoperatorio y postoperatorio de la persona amputada, la prescripción de la prótesis y la rehabilitación integral. Guía para profesionales de la salud*. Bogotá: Portal único del Estado Colombiano; 2015. Available at: https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/DE/CA/gpc-completa-personas-amputada-prescripcion-protesis-rehabilitacion-integral.pdf. Accessed June 02, 2023.
21. Ángulo B, Arango Hoyos GP, Bolaños Roldan M, et al. Ruta crítica en la rehabilitación de las personas con trauma raquimedular (TRM) del Hospital Universitario del Valle (HUV), Colombia. *Rev Col Med Fis Rehab*. 2013;23:106–110.
22. Cárdenas N, Leal DG, Garzón DM, et al. Nataly Cárdenas. *Guía de Atención a Personas con Trauma Raquimedular Cervical. Enfoque Desde la Terapia Ocupacional*. Bogotá: JSTOR; 2013. doi: 10.2307/j.ctvm204f8
23. Ministerio de Salud y Protección Social. *Boletín No 3 Observatorio Nacional de Discapacidad*. Bogotá: Portal único del Estado Colombiano; 2014. Available at: https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/DE/PS/Boletin-OND-3.pdf. Accessed May 29, 2023.
24. Barreras de acceso del sistema de salud colombiano en zonas rurales: percepciones de usuarios del régimen subsidiado. *Hacia Promoción Salud*. 2020;25:29–38.
25. DANE. *Censo Nacional de población vivienda 2018*. Colombia: DANE; 2019. Available at: https://www.dane.gov.co/index.php/estadisticas-por-tema/demografia-y-poblacion/censo-nacional-de-poblacion-y-vivenda-2018. Accessed May 30, 2023.
26. Gómez-Perea CA, Pasos-Revelo LM, González-Rojas T, et al. Health services accessibility for people with physical disabilities in Zarzal (Valle del Cauca, Colombia). *Salud Uninorte*. 2019;34:276–283.
27. Camacho YR. *Beneficios de la fisioterapia en fracturas de miembro inferior y su casuística*. Guatemala: Repositorio Institucional Univ San Carlos Guatemala; 2017. Available at: http://www.repositorio.usac.edu.gt/7850/1/Yaqueline%20del%20Rosario%20Camacho%20Quiterio.pdf
28. Rojas García M, Diaz CC. *Protocolo de rehabilitación en fracturas Hospital Universitario San Rafael de Tunja*. Tunja: Servicio Fisiatría y Terapia Física, Sistema Daruma, Secretaria de Salud de Boyacá; 2014.
29. Ministerio de Salud y Protección Social. *Boletin de Prensa No 889 de 2021. Minsalud continúa fortalecimiento de servicios de rehabilitación*. Bogotá: Portal único del Estado Colombiano; 2021. Available at: https://www.minsalud.gov.co/Paginas/Minsalud-contin%C3%BAa-fortalecimiento-de-servicios-de-rehabilitaci%C3%B3n.aspx. Accessed June 2, 2023.
30. Ministry of Health. *Subjects clinical protocols and therapeutic guidelines - PCDT 2018 Archives*. Available at: https://www.gov.br/saude/pt-br/assuntos/protocolos-clinicos-e-diretrizes-terapeuticas-pcdt/arquivos/2018?b_start:int=20. Accessed June 2023.
31. Setor de Fisioterapia HCRP-FMRP-USP. *Protocolos de Reabilitação*. Available at: https://edisciplinas.usp.br/pluginfile.php/5824444/mod_resource/content/4/Protocolos%20HCRP%202019%20%281%29.pdf. Accessed June 2023.
32. Barbosa RI, Marcolino AM, Fonseca MCR. Rehabilitation of patient with humerus proximal fracture internally fixed with a fixed-angle plate. *J Health Sci Inst*. 2010;28:280–282.
33. Barbosa RI, Marcolino AM, Fonseca MCR, et al. Retrospective functional assessment of patients with humerus proximal fractures internally fixed with a fixed-angle plate for proximal humerus area. *Acta Ortop Bras*. 2008;16:89–92.
34. Arliani GG, Utino AY, Nishimura EM, et al. Acromioclavicular dislocation: treatment and rehabilitation. Current perspectives and trends among Brazilian orthopedists. *Rev Bras Ortop*. 2015;50: 515–522.
35. Giordano V, Pires RE, Labronici PJ, et al. Open reduction and internal fixation of Ideberg type IA glenoid fractures: tricks, pearls, and potential pitfalls based on a retrospective cohort of 33 patients focusing on the rehabilitation protocol. *Eur J Orthop Surg Traumatol*. 2023;33:571–580.

36. Queiroz RD, Borger RA, Heitzmann LG, et al. Intracapsular femoral neck fractures in the elderly. *Rev Bras Ortop (Sao Paulo)*. 2022;57:360–368.
37. Carneiro MB, Alves DP, Mercadante MT. Physical therapy in the postoperative of proximal femur fracture in elderly. Literature review. *Acta Ortop Bras*. 2013;21:175–178.
38. Silva AR, Sime MM. Barriers and facilitators to return to work post-acute orthopedic trauma in upper limbs: an integrative literature review. *Cad Bras Ter Ocup São Carlos*. 2019;27:426–437.
39. Lee KJ, Um SH, Kim YH. Postoperative rehabilitation after hip fracture: a literature review. *Hip Pelvis*. 2020;32:125–131.
40. Paula P. *71% dos brasileiros têm os serviços públicos de saúde como referência. Biblioteca Virtual em Saúde*. Ministry of Health. Available at: https://bvsms.saude.gov.br/71-dos-brasileiros-tem-os-servicos-publicos-de-saude-como-referencia/. Accessed June 2023.
41. Arévalo Nueva LC. La historia clínica fisiátrica, importante arma para un buen pronóstico rehabilitador. *Rev Cubana Med Física Rehabil*. 2020;12: e417.
42. Martin Cordero JE. Rehabilitación en Cuba. Pasado, Presente y Futuro. *Rev Cub Ort Traum*. 2020;35:23–31.
43. *Generalidades de agentes físicos. En: Cordero Martín JE. Agentes físicos terapéuticos*. La Habana: Ecimed; 2008. p. 3–17.
44. Clasificación internacional del funcionamiento de la discapacidad y de la salud: CIF: versión abreviada. Thumbnail. View/Open. 9241545445_spa.pdf (845.9Kb). Description. Published by Instituto de Mayores y Servicios Sociales (IMSERSO) 248 p. ISBN: 8484460770.
45. Reyes A. Fisioterapia: pasado, presente y ¿futuro? [Internet]. 2006 Argentina [citado 22 Ene 2015]. Disponible en. Available at: http://www.efisioterapia.net/articulos. Accessed September/October 2023.