Webinar transcript: Rehabilitation in conflict –Traumatic Brain Injury

This is an edited transcript of the webinar. Minor changes have been made for clarity, readability, and accessibility. The content has been structured to support translation tools and screen readers.

Pete Skelton (WHO)
Good afternoon, good evening, or indeed good morning, depending on where in the world, you're joining us from. I hope everybody is keeping safe and well.

And welcome to the fourth session of the Rehabilitation in Conflict webinar series, this time on traumatic brain injury.

I'm delighted that this session is being run by the International Society for Physical and Rehabilitation Medicine (ISPRM).

Without further ado, I'm going to hand over to **Dr Maria Paul (ISPRM)**, who will take us through the rest of the session. Dr Paul, thank you very much.

Dr Maria Paul (ISPRM)
Thank you, Pete.

Hello, everyone, and greetings from Adelaide, Australia, where the time is 1:30 in the morning. I'm Dr Maria Paul, a rehabilitation physician based here in Adelaide, and secretary for ISPRM. I'll be moderating the session today.

Joining me in the Q&A will be **Dr Farooq Rathore**, professor in rehabilitation medicine and army doctor in Pakistan, and **Dr Volodymyr Golyk (WHO)**, technical officer for disability and rehabilitation at WHO Ukraine.

Our main speaker today is **Dr Anas Hassan**.

Dr Hassan is a consultant in neurorehabilitation in the UK. His work spans inpatient, community, home-based, and remote rehabilitation, with a strong focus on service development, multidisciplinary working, and making efficient use of available resources to improve patient outcomes in challenging settings.

Originally from Gaza, Palestine, Dr Hassan's journey across multiple countries has given him multinational experience and a deep understanding of different healthcare systems, cultures, and approaches to rehabilitation. He is committed to improving rehabilitation and disability care for Palestinians through education, guidance, and practical service development.

He has led and supported on-the-ground physiotherapy teams to strengthen primary assessment and follow-up of amputee patients and has presented internationally, including on the Gaza Amputee Rehabilitation Initiative.

He also completed a one-year Healthcare Leadership Academy programme where he developed skills in team leadership and resource management in difficult circumstances, including war and natural disasters.

We'll have plenty of time for questions and discussion at the end. You may start putting your questions in the Q&A box straight away and I'll be monitoring it.

So, over to you, Dr Hassan.

Presentation

Dr Anas Hassan (ISPRM Emergency Rehabilitation Committee)
Thank you, Professor Maria.

Hello, everyone. I'll start by sharing the screen and then we can take it from there.

Good morning, good evening, good afternoon, and welcome everyone. I'm Dr Anas Hassan, consultant in neurorehabilitation medicine at Walkergate Park Hospital in Newcastle, United Kingdom.

I'm presenting today on behalf of the Emergency Rehabilitation Committee of the International Society of Physical and Rehabilitation Medicine (ISPRM ERC) as part of this WHO-supported webinar series.

The title of my talk is traumatic brain injury: emergency management and rehabilitation implications.

Over the next 20 minutes, I'll take you through the clinical landscape of traumatic brain injury, from definition and epidemiology through acute management and rehabilitation, all the way to community-based strategies and long-term follow-up.

This talk is designed to be particularly relevant and applicable to low-resource and conflict-affected settings.

Before going into the content, let me briefly walk through the structure of the session. We will cover an introduction to traumatic brain injury, adapted clinical management in emergency settings, common acute complications, rehabilitation challenges, adapted rehabilitation practice including community-based strategies, and mental health and psychological support for TBI survivors. This is a broad topic, so I will aim to be concise and evidence-informed, focusing on what is most actionable in the field.

Definition of traumatic brain injury

Traumatic brain injury is defined, using the Scottish Intercollegiate Guidelines Network definition, as a traumatically induced structural injury and/or physiological disruption of brain function resulting from external force, indicated by new onset or worsening of at least one clinical sign following the event.

These signs include loss or decreased level of consciousness, loss of memory immediately before or after the event, changes in mental state such as confusion or disorientation, neurological deficits including weakness, vision change, aphasia or sensory loss, and the presence of intracranial lesions on imaging.

This definition captures the breadth of TBI presentations, from subtle cognitive changes to coma and structural haemorrhage.

Epidemiology and prevalence

How prevalent is TBI?

Mild TBI, or concussion, accounts for around 100–300 cases per 100,000 people annually. Moderate TBI occurs at approximately 15–20 per 100,000, while severe TBI affects around 12–14 per 100,000. Risk of death rises sharply in severe cases and in elderly patients.

Two important contextual factors are worth highlighting. First, TBI has a strong association with socioeconomic deprivation. Lower-income settings have both higher exposure to injury and less access to care. Secondly, there is a significant lack of awareness and advocacy for TBI within wider emergency and first responder communities.

These are not just statistics — they are a call to action.

Classification of TBI severity

There are three recognised categories: mild, moderate, and severe TBI.

Mild TBI is characterised by loss of consciousness lasting less than 30 minutes, a Glasgow Coma Scale score of 13–15, and post-traumatic amnesia lasting less than 24 hours.

Moderate TBI involves altered consciousness lasting 30 minutes to 24 hours, a GCS score of 9–12, and post-traumatic amnesia lasting one to seven days.

Severe TBI involves loss of consciousness lasting more than 24 hours, a GCS score of 3–8, and post-traumatic amnesia exceeding seven days.

This classification remains the most practical and widely available assessment tool in the field, particularly in austere or resource-limited settings where imaging may not be available.

Blast injuries in conflict settings

Given the conflict-affected contexts many of us work in, understanding blast injury mechanisms is essential.

Primary blast injury is caused by the pressure wave affecting gas-filled organs such as the lungs and ears. Secondary blast injury is caused by projectiles and debris. Tertiary blast injury occurs when the body is physically displaced or thrown. Quaternary blast injury includes burns, inhalation injuries, toxic exposure, and associated trauma. In practice, most blast casualties present with a combination of these injuries.

TBI care in high-income versus conflict settings

One of the most important realities in global TBI care is the contrast between high-income settings and austere environments.

In high-income settings, patients may have access to specialised neuro intensive care units, continuous intracranial pressure monitoring, MRI availability, intensive multidisciplinary rehabilitation teams, and structured discharge and outpatient support.

In conflict and austere settings, hospitals may rely primarily on clinical observation and Glasgow Coma Scale monitoring. Rehabilitation is often family-led using household items, with very limited staffing support and discharge to refugee camps or unmodified homes.

These differences are not presented to discourage anyone, but to motivate adapted and practical approaches.

Main goals of TBI management

Regardless of resource availability, the goals remain constant.

The first is early triage and rehabilitation involvement. The second is acute life-saving management and prevention of secondary brain injury. The third is improving functional outcomes and helping patients return to meaningful activities. The fourth is minimising complications. The fifth is educating families and caregivers. The family often becomes the primary rehabilitation team.

Neuroprotection principles

The foundation of TBI management is neuroprotection.

Key principles include maintaining cerebral perfusion and blood pressure, maintaining oxygen saturation above 94%, avoiding hypo- or hyperventilation, seizure prevention, temperature control, glucose control, pain management, and sodium balance management. These principles apply across all settings.

Operative and non-operative management

Ideal surgical management requires CT imaging, a sterile operating theatre, and an experienced neurosurgeon.

In austere settings, management relies heavily on repeated Glasgow Coma Scale monitoring and medical neuroprotection measures such as head elevation, oxygenation, blood pressure control, and seizure prophylaxis.

When surgical options are unavailable, every component of medical neuroprotection becomes even more important.

Common acute complications

Common acute complications include cerebral oedema and raised intracranial pressure, aspiration and dysphagia, paroxysmal sympathetic hyperactivity, and infections including pneumonia and urinary tract infections.

Early recognition significantly reduces morbidity.

Early rehabilitation

Evidence consistently shows that early initiation of rehabilitation improves outcomes.

Even in intensive care settings, once patients are medically stable, passive range of motion exercises, positioning, active-assisted exercises, and family-supervised rehabilitation can begin. Rehabilitation does not begin after discharge. It begins in the acute phase.

Post-traumatic amnesia

Post-traumatic amnesia is a temporary and expected stage of brain healing.

It can present with confusion, disorientation, memory impairment, agitation, and behavioural changes. Families must be reassured that these behaviours are driven by injury and are not deliberate. In resource-limited settings, simple clinical questions can guide assessment. Clinicians can ask whether the patient knows where they are and whether they remember yesterday.

Family-led management

Families are central to rehabilitation.

Caregivers should be educated and reassured that the patient's behaviour is caused by brain injury and not deliberate actions. Communication should be calm, simple, and reassuring. Environments should be kept predictable and quiet where possible, and safety measures should be implemented to prevent falls and wandering. These are low-cost, high-impact interventions.

Medication management

Pharmacological management requires caution.

Environmental modification should always be considered first. When medication is required, the principle should be to start low and go slow because injured brains are more sensitive to side effects. Examples discussed included gabapentin, valproate, and olanzapine.

Acute and chronic rehabilitation

Goals should focus on practical daily activities such as feeding, toileting, transfers, and basic mobility.

Neuroplasticity is activity dependent. The brain does not distinguish between treadmill training and walking through a market. What matters is repetition, engagement, and functional relevance.

Community-based rehabilitation

In the absence of formal rehabilitation centres, community-based rehabilitation becomes the primary model. This may include outdoor walking, community ambulation, family-led therapy, the use of schools or markets for gait training, and community volunteers as peer supporters. The focus is sustainability and family empowerment.

Low-cost rehabilitation principles

High repetition of functional tasks drives neuroplasticity.

Simple tools such as sand-filled bottles, stairs, and walking paths can be highly effective. Short daily home sessions may sometimes be more beneficial than occasional centre-based rehabilitation sessions.

Managing complications in low-resource settings

Complication prevention includes pressure injury prevention, stretching and splinting for contractures, infection prevention, and monitoring for hydrocephalus. Blast injuries may also cause visual and hearing impairments that can otherwise be missed.

Nutrition

Nutrition is a critical but often under-recognised component of TBI rehabilitation.

Early oral intake should begin when safe, modified textures should be used where dysphagia is present, and enteral feeding should be considered if oral intake is unsafe. Malnutrition and micronutrient deficiencies can significantly impair recovery. The brain cannot repair itself without adequate fuel.

Communication difficulties

TBI commonly impairs communication.

Challenges may include aphasia, dysarthria, auditory processing difficulties, memory impairment, and social communication difficulties. Speech and language therapy should be integrated early whenever possible.

Follow-up care

TBI requires structured long-term follow-up.

Monitoring should include wound healing, chronic pain, hearing and vision, and psychological health. PTSD, depression, and anxiety are highly prevalent and can significantly affect rehabilitation outcomes.

Key messages

Explosions produce overlapping injury patterns and patients must be assessed systematically. Rehabilitation is not a luxury. It is a core part of trauma management and should begin early.

Both physical and psychological consequences of TBI must be addressed because the injury affects the whole person, their family, and their community.

Q&A session

Long-term rehabilitation in conflict settings

Question (Rama Muhammad)
How can long-term rehabilitation be achieved in conflict contexts, especially post-discharge where compliance and follow-up are difficult?

Dr Anas Hassan (ISPRM ERC)
The key is starting from the beginning by explaining clearly to the family what to expect and how recovery works. Families become central to long-term rehabilitation. In conflict settings, patients often cannot travel repeatedly for follow-up, so caregivers must be taught what to do, what to monitor, and how to continue exercises safely at home. Flexibility and adaptation are essential.

Timing of early rehabilitation

Question (Verena Kleiliger)
What is the ideal timing for starting early rehabilitation?

Dr Farooq Rathore (Pakistan)
The earlier, the better.

This principle applies everywhere, both in conflict settings and peacetime. The challenge in disasters and wars is the lack of ideal resources, but whatever is available should be used, including early assessment, early mobilisation, and early rehabilitation planning. Traumatic brain injury often gets neglected during disasters, so rehabilitation professionals must advocate for early involvement.

Vestibular rehabilitation

Question
Should vestibular rehabilitation be used in all TBI patients?

Dr Maria Paul (ISPRM)
Vestibular dysfunction is common after TBI, but not all patients require vestibular rehabilitation. Patients should first be assessed for benign paroxysmal positional vertigo, dizziness, and vestibular dysfunction. Those who test positive can benefit significantly from targeted treatment.

Raised intracranial pressure and physiotherapy

Question
What is the physiotherapist's role in raised intracranial pressure?

Dr Anas Hassan (ISPRM ERC)
Physiotherapists and families need to recognise warning signs such as confusion, vomiting, seizures, and cognitive deterioration. If patients are clinically unstable or highly agitated, physiotherapy should be delayed or modified.

Ukrainian experience of rehabilitation during war

Dr Volodymyr Golyk (WHO Ukraine)
Ukraine has experienced simultaneous healthcare reform, rehabilitation system development, and ongoing war. Rehabilitation services have been integrated into municipal hospitals to allow rehabilitation professionals to work alongside acute care teams. Modern warfare has also changed injury patterns, with blast injuries and drone-related injuries becoming more common. Challenges include internal displacement, antimicrobial resistance, the need for assistive products, and continuity of care across regions.

Cognitive rehabilitation after TBI

Question
How should cognitive dysfunction be managed after TBI?

Dr Maria Paul (ISPRM)
Traditional "brain games" and puzzles are often less effective than practical daily activities. Key strategies include establishing routine, using compensatory memory strategies, reducing cognitive overload, and helping families recognise signs of fatigue and overstimulation.

PTSD after TBI

Question
Do TBI patients suffer from PTSD and how should it be managed?

Dr Farooq Rathore (Pakistan)
PTSD is highly prevalent after TBI, especially in conflict settings. Importantly, PTSD may affect both patients and caregivers. Screening and early recognition are essential.

Dr Volodymyr Golyk (WHO Ukraine)
Certain rehabilitation technologies may unintentionally trigger trauma responses. Examples include electrical stimulation in torture survivors and VR equipment in former drone operators. Rehabilitation plans must account for lived experiences.

Mild and moderate TBI being missed

Question
How can rehabilitation professionals identify hidden TBIs during mass casualty situations?

Dr Maria Paul (ISPRM)
Brain injury is often a hidden injury. Patients may appear physically well but still have memory problems, emotional difficulties, confusion, headaches, or vomiting. Clinicians should maintain a high index of suspicion and investigate appropriately.

Key clinical indicators when imaging is unavailable

Question
What are the most reliable clinical indicators when CT or MRI is unavailable?

Dr Anas Hassan (ISPRM ERC)
The most practical tools are the Glasgow Coma Scale, duration of loss of consciousness, and duration of post-traumatic amnesia. Clinical examination remains essential.

Rehabilitation education resources

Question (student attendee)
What resources are recommended for learning about neurological rehabilitation?

Dr Farooq Rathore (Pakistan)
Disaster rehabilitation has advanced significantly over the last 20 years. Useful approaches include online webinars, international collaboration, ISPRM Emergency Rehabilitation Committee resources, and focused online learning and case-based discussion.

He encouraged attendees to explore ISPRM ERC resources and engage globally.

Closing remarks

Dr Maria Paul (ISPRM)
Three key take-away messages are that you do not need sophisticated technology to diagnose and treat TBI because basic clinical skills are fundamental; rehabilitation should start early and involve the family; and brain injury can be a hidden disability, so clinicians must not miss it.

Thank you once again to WHO, World Physiotherapy, Dr Anas Hassan, Dr Volodymyr Golyk, and Dr Farooq Rathore for making this webinar possible.

If you require this transcript in an alternative accessible format, please contact World Physiotherapy.