

Hand therapy experience after major earthquakes in 2023 in Türkiye: A single-site evaluation

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Abstract

Introduction: Although post-disaster rehabilitation is increasingly recognized as essential, the role of hand therapy remains underexplored. Following the two devastating earthquakes in Türkiye in 2023, which resulted in over 50,000 deaths and 120,000 injuries, this study presents experiences and practices in post-disaster hand therapy to address the existing knowledge gap.

Objective: This study aims to share post-earthquake hand therapy experiences, highlight patient care challenges, and provide recommendations for future disaster management.

Methods: This retrospective study involves patients who were transported from the disaster area to a tertiary hospital by ambulance. Each patient referred to hand therapy by the hand surgeon was treated and followed up by two hand therapists. The patients had various injuries, including compartment syndrome, fasciotomy, amputations, and fractures. All patients were seen at least once for therapy.

Results: This retrospective study evaluated 24 patients aged 5–63 who were referred to a tertiary centre for hand therapy following the earthquake. All patients were trapped under rubble, with compartment syndrome, amputations, and fractures being the most common injuries. Therapy began on average 3–4 weeks post-disaster. Twelve patients completed treatment, while 10 were lost to follow-up. All patients developed joint limitations and deformities.

Discussion: Our post-disaster hand therapy experiences have shown the necessity of educating the hand therapists and the other healthcare professionals before the disaster, approaching patients within a multidisciplinary framework and planning treatment, and placing emphasis on increasing functional recovery in the long term.

Keywords

Disaster, earthquake, hand therapy

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Introduction

Türkiye is a transcontinental country in Western Asia and South-Eastern Europe, with a population of approximately 85 million. It is located in the Mediterranean Earthquake Belt, known as the world's second most important earthquake zone.¹ Due to its geological location, situated on two tectonic plates called Eurasian and African plates, Türkiye has a long history of earthquakes. Over the past century, 16 earthquakes with magnitudes of 7.0 or greater have been recorded.² On 6 February 2023, two major earthquakes struck along the Eastern Anatolian Fault just 9 hours apart, causing widespread destruction across 11 provinces, with over 50,000 fatalities and more than 120,000 injuries.³

Despite recurrent major earthquakes in Türkiye, there remains a paucity of knowledge and experience regarding disaster scenarios and post-disaster physiotherapy

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applications. Although the role of physiotherapists and occupational therapists during the recovery after disasters is not fully defined, rehabilitation is increasingly emphasised in clinical guidelines and described as an essential health service in emergencies.⁴⁻⁷ Following a disaster, due to the priority given to life-saving surgeries and systemic interventions in the initial phase, patients typically receive rehabilitation in the later stages of recovery.⁵ The literature suggests that disaster response programmes are primarily medically focused, and that physiotherapists can alleviate the workload of medical staff by managing selected patients, thereby promoting a more functional and holistic recovery.⁸

Increasing survival rates, enhancing quality of life, lowering complications, and making sure that affected individuals attain optimal health and functionality are some of the most important effects of rehabilitation.⁹⁻¹¹ Rehabilitation also decreases readmission rates, shortens hospital stays, and minimises expensive and potentially lethal complications.¹² Furthermore, even in environments with limited resources, rehabilitation interventions can be performed due to their cost-effectiveness.¹³ Based on these, it has been reported that rehabilitation makes emergency health services more efficient and effective.¹⁴

Although rehabilitation is generally mentioned in the guidelines, it was observed that hand therapy is not specifically included. Furthermore, hand therapy is a post-graduate specialty that is not yet well-established in many countries, and as such, there has been no sustained transfer of experience regarding its use in disaster situations. The chaotic nature of disasters often impedes systematic documentation, resulting in scarce archival records of first-hand experiences. This undermines knowledge transfer for evidence-based preparedness strategies.⁷

The World Confederation for Physical Therapy encourages physiotherapists' active involvement in disaster management and preparedness plans. Before, during, and after disasters, physiotherapists should be involved in procedures like offering rehabilitative services and preventive education. Additionally, by giving the impacted population access to physiotherapy and rehabilitation treatments, they should help ensure the best possible health and functional recovery. In addition to provide advice to physiotherapists and encouraging the inclusion of disaster management education in physiotherapy curricula, member organisations should work with national governments and civil society organisations to create disaster management plans.¹⁵ Gohy et al. (2016) stated that the integration of physiotherapists into trauma teams is necessary and that medical teams should be made aware of the importance of physiotherapy in order to improve the quality of patient care and ensure optimal recovery.¹⁶

Despite the recognised role of physiotherapy in disaster recovery, the specific application of hand therapy remains markedly underexplored. This literature gap is particularly

evident in the post-disaster phase, where early intervention in hand function may significantly enhance overall rehabilitation outcomes. The aim of this study is to share our hand therapy experiences in the post-disaster period, with the goal of identifying enhanced hand therapy interventions for future disaster management. By examining the challenges encountered in the overall treatment process, this study seeks to contribute to the development of more effective strategies for hand therapy in disaster settings.

Methods

This retrospective observational study is based on the authors' firsthand experiences as two hand therapists who directly treated patients at a single tertiary referral centre in Ankara, Türkiye, with a hand surgeon within a dedicated hand surgery clinic. Data were derived from clinical observations, patient interactions, and available patient records of earthquake victims transferred from the disaster area. Ethical approval for this study was obtained from the Gazi University Ethics Committee (research code 2024-1654), and the study was conducted in accordance with the Declaration of Helsinki.¹⁷

Verbal informed consent was obtained from all patients for the publication of their anonymised information; for patients under 18 years old, consent was obtained from their legal guardians. No patients were unable to consent due to cognitive impairment, and for non-Turkish speakers, consent was obtained with the assistance of a translator or bilingual healthcare provider.

In the chaotic post-disaster environment, patient documentation systems were disrupted due to power supply interruptions, rendering patient databases and surgical records insufficient. As a result, we had no reliable information regarding the emergency interventions administered in the disaster area. Therefore, we tried to get information verbally through patients, their relatives, and doctors. Therapists recorded each patient's functional status, therapy interventions, and treatment progress. These records were later reviewed to identify common challenges and formulate recommendations for post-disaster hand therapy protocols, which constituted the data for this study.

Patients with upper extremity injuries, who had received the necessary surgical interventions and were referred to hand therapy by a hand surgeon, were treated. However, clear information regarding the initial emergency treatment after rescue was unavailable.

In a post-disaster setting, incomplete medical histories posed significant challenges in identifying contraindications for rehabilitation interventions. To ensure patient safety, all therapy interventions were conducted with a cautious and conservative approach. Before applying any modality, a detailed clinical evaluation was performed based on the patient's self-reported history, observable signs, and

physician recommendations before therapy sessions. When contraindications were suspected but could not be confirmed due to missing medical records, conservative treatment approaches were preferred. Electrical stimulation and thermal modalities were applied only when peripheral nerve function and vascular integrity could be reasonably verified through clinical examination. In cases where uncertainty remained, therapy focused on active movement, proper hand positioning, and manual techniques to minimise risk while promoting functional recovery. Patients were followed only during their hospital stay and under the supervision of the hand surgeon until discharge; those who remained in Ankara after discharge continued to be seen in the hand therapy outpatient clinic.

In the description that follows, firstly, the information will be given about the patients that consulted for hand therapy, interventions applied, and results even if they are limited; the struggles that a hand therapist may face in the post-disaster period; and finally, suggestions for future post-disaster planning will be explained.

Inpatient physiotherapy management

In the early phase, defined as the period during which patients remained hospitalised and received inpatient treatment, physiotherapy sessions were conducted once a week in the hand surgery clinic by both the surgeon and the therapist.

Despite being outpatients from the beginning, two patients received treatment similar to that of hospitalised patients due to the severity of their injuries and the need for continuous monitoring. Consequently, these patients underwent interventions comparable to those provided during inpatient care, ensuring consistency in rehabilitation approaches.

Patient education was prioritised at the beginning of each session. Patients were encouraged to use their hands in daily activities, perform prescribed exercises, apply massage as instructed if needed, keep their skin moisturized, and maintain proper hand positioning to prevent deformities. When providing recommendations, any accompanying caregivers (if present) were also included in the educational process to ensure continuity of care. One patient who refused treatment did not participate in the sessions; however, their companions were provided with the necessary education.

Splints based on anti-claw and C-bar positions were required for all patients to prevent or correct deformities. Thus, all the splints were designed to maintain the hand in a functional position, with emphasis on the “intrinsic plus” position and the protection of the thumb web space. Due to the extraordinary conditions following the disaster, modifications to standard hand therapy interventions were frequently necessary. Splint fabrication was

delayed due to the heavy patient load; therefore, the functional position was maintained with external supports (such as simply placing a water bottle in the web space) until the splint was made by hospital’s splint staff (Figure 1).

All patients had skin complications due to abrasions during rescue from the debris, post-operative scars, graft transplants, and inadequate skin care (Figure 2). Instructions regarding skin care, cleansing, and moisturizing were provided. In addition, all patients had extensive incision lines and dense scar tissue. Scar tissue mobilisation techniques were performed and taught to both patients and their companions as part of their home rehabilitation programme.

Most patients exhibited significant oedema (Figure 3). To address this, limb elevation and classical massage techniques were recommended and integrated into their treatment programmes.

In patients who could be followed during their hospital stay, each therapy session commenced with scapular mobilisation and glenohumeral joint mobilisations to enhance proximal mobility and improve lymphatic drainage, thereby contributing to oedema management. Passive and active assistive range of motion exercises for the shoulder, elbow, wrist, finger, and thumb were given to all patients to prevent joint stiffness and maintain mobility.

Patients with no contraindications were encouraged to engage in light daily activities in the early period, like eating, combing hair, and using the mobile phone. Safe and accessible household objects, such as plastic combs, water bottles, forks, and cups, were incorporated into training sessions to facilitate functional use of the hand (Figure 4).

Additionally, interventions such as electrical stimulation for denervated and/or weakened muscles, heat and cold applications, and targeted exercises (including stretching and strengthening) were introduced as needed. An individual home program was prepared for each patient, including massage, strengthening and flexibility exercises, range of motion exercises, and performing daily life activities.

Outpatient physiotherapy management

In later stage (following the completion of surgical procedures or during the outpatient phase), all patients were encouraged to use the affected extremity as much as possible. They were provided with examples of functional exercises and instructed to incorporate them into their daily activities. Patients who required or were likely to require secondary reconstruction were advised to continue scar tissue mobilisation and maintain joint range of motion to prevent restrictions in skin mobility.



Figure 1. Support to maintain functional position (intrinsic plus in addition to web space protection) until the receiving the orthosis.

Results

This retrospective study was conducted on a total of 24 patients who attended the hand surgery clinic; two were outpatients from the onset of hand therapy, while the remaining patients were consulted by a single hand surgeon during their hospitalisation. The patients' age was between 5 and 63 years. Sixteen patients were women (67%), six were under 18 years old, and three were not native Turkish speakers.

Patients included in this study were transferred from the earthquake-affected region to a tertiary hospital via ambulance and were admitted to the hand surgery clinic. They were referred for physiotherapy by a hand surgeon based on their rehabilitation needs. No active recruitment was performed; only patients who were clinically indicated for hand

therapy were included. Hand therapy was provided by 2 physiotherapists (ZE and ÖG) experienced in the field.

All the patients were injured under the rubble. On average, it took approximately three ($n = 15$) to 4 weeks ($n = 9$) for all patients to access physiotherapy after the disaster. By the time they were first assessed, they had already undergone various surgical procedures including fasciotomy and serial debridement ($n = 17$), amputation ($n = 5$), and fracture fixation surgery ($n = 8$), free muscle transfer ($n = 6$). Patients had multiple surgeries and continued to have surgeries throughout therapy. Some patients were still on infection control interventions. Some of them had negative pressure (vacuum) therapy, and some of them were on the waiting list, due to uncontrolled infection, for surgical interventions like fracture fixations.



Figure 2. Skin problems after fasciotomy and graft surgery, with visible signs of recovery from rubble.

One of the adult patients refused to receive hand therapy. Due to excessive agitation, one child at 5 years of age did not receive treatment. The remaining 22 patients were followed up as inpatients and outpatients after their discharge as long as possible. The follow-up period and therapy frequency varied among the patients due to factors such as access to the hospital and willingness to participate, which also represent significant challenges in our study. Due to the excessive number of patients in the inpatient clinics, some patients were transferred to other inpatient clinics and were followed up on weekly visits. Those patients continued to receive daily hand therapy by staff physiotherapists of the inpatient service according to the recommendations in our weekly consultations.

Of the 24 patients who participated in the study, one refused therapy, one did not continue therapy, 10 were lost to follow-up due to relocation to another city, and 12 completed the treatment program. Therefore, the treatment period was mostly limited to one session and follow-up was impossible.

Our most significant observation was that all the patients developed joint limitations and deformities due to improper upper extremity positioning, particularly of the hand during the early period. Since most patients had been trapped under debris for prolonged periods, nearly all had sustained compartment syndrome and/or crush injuries, leading to varying degrees of peripheral nerve involvement in the upper extremity. However, due to the priority given to life-threatening conditions such as crush syndrome and



Figure 3. A patient with oedema in the hand (a, b)

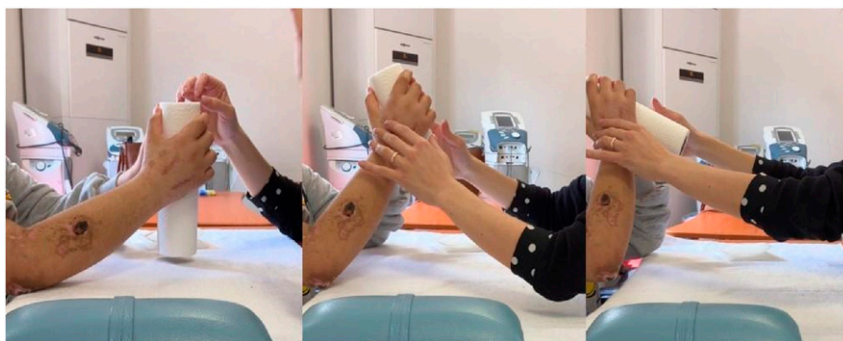


Figure 4. An example of simulating daily activity exercises (drinking from a bottle or a glass).

amputation, hand and wrist problems were largely neglected. As a result, all patients had stiffness in the metacarpophalangeal joints and thumb web space contracture due to the improper positioning of the upper extremity (Figure 5). The injury of peripheral nerves of the upper extremity or prolonged immobilization of the hand resulted in inevitable deformities. Therefore, all patients required splinting for deformity correction splints in the functional position of the hand.

Moreover, the limited number of hand therapists posed a significant challenge. Furthermore, there were no specialized hand therapy services available for patients who relocated to another city following discharge, limiting their access to continued rehabilitation.

Discussion

From the day of the earthquakes, hand therapists were eager to provide treatment to victims in the disaster area. However, Türkiye's National Disaster Response Plan primarily includes hospitals within the scope of emergency medical interventions, focusing on triage, acute medical care, and

patient evacuation.¹⁸ Rehabilitation is not explicitly mentioned as part of post-disaster healthcare planning. While global frameworks such as the World Health Organization (WHO)'s emergency response plans acknowledge the necessity of rehabilitation, they do not provide detailed guidance on specialised rehabilitation services, such as hand therapy, within disaster settings.⁴ Moreover, many healthcare facilities were destroyed, and those that remained operational were prioritised for life-saving interventions in the disaster area. As a result, hand therapy could only be initiated for patients whose initial emergency treatments had been completed and who had been transferred to Ankara for further care.

The fact that patients started hand therapy 3–4 weeks after the earthquake was a major negative in terms of preventing complications. However, the magnitude of this disaster must be taken into account, with patients being trapped under rubble for hours or even days. Given the inadequacies in the patient transfer system, the thousands of individuals affected, and the overwhelming congestion in healthcare facilities, it is unsurprising hand therapy was not prioritized.



Figure 5. Web space contracture due to improper positioning of a 13-year-old female (a) and 14 year-old male patients (b).

The nature of injuries sustained during the earthquake varied widely, ranging from minor soft tissue injuries to life-threatening conditions, including head, chest, and abdominal trauma, as well as crush injuries and amputations.¹⁹ All patients had problems similar to those in the previous report of the Nepal earthquake in 2015.²⁰

The importance of early splinting in the post-traumatic period has been well documented in the literature.^{21,22} Sim et al. also emphasised the significance of orthotic use following trauma.²³ The splinting needs identified in this study align with existing literature, further underscoring its importance. Previous studies have demonstrated that early intervention in post-trauma rehabilitation significantly improves functional outcomes and prevents long-term disability.²⁴ The findings of this study further support these conclusions, emphasising the need for immediate rehabilitation strategies also in disaster settings.

The complexity of injuries often extended beyond the upper extremities, as many patients had concurrent lower limb injuries or head trauma, further complicating rehabilitation. As an example, one patient had a leg amputation and crush injury of the upper extremity nerves. It was challenging for patient to use crutches which were essential to mobilizing. Consequently, this patient faced significant challenges in using crutches, which were essential for mobility. This highlights the distinct challenges of post-earthquake rehabilitation, where patients frequently present with multiple injuries. Unlike routine rehabilitation following a single trauma, post-disaster rehabilitation requires a multidisciplinary approach, as supported by previous studies.²⁵

An additional challenge was the absence of patient companions, as many had lost their families in the

earthquake. Some patients had volunteer companions with them, but they stayed with the patient according to their shift periods within a structured timetable. This lack of consistent companion support significantly restricted the effectiveness of hand therapy, as patients largely relied on self-exercises and independent application of rehabilitation techniques.

Since the patients were transferred to Ankara, a city far from the earthquake zone, accommodation after hospital discharge was another significant issue. While most of them returned to their hometowns in the disaster area, some moved to different cities. Due to the temporary nature of post-earthquake housing, official addresses and phone numbers were often unavailable, making patient follow-up nearly impossible. Although some patients continued to attend outpatient therapy sessions, their visits were irregular. As a result, long-term outcomes could not be systematically assessed for this study.

One of the most challenging aspects of hand therapy in this context was the psychological state of patients. Motivation to participate in therapy and communication difficulties were particularly notable.

Earthquakes are reported to result in posttraumatic stress disorder, anxiety, and depression in victims.²⁶ Since each age group experiences the post-disaster process differently, an individual-tailored approach was required for each patient. For this reason, we think that communication skills and psychosocial rehabilitation are among the most important requirements in the post-earthquake period. Because the physical and emotional trauma of the patients was so severe, we had to be very careful about what we said during the treatment sessions. Patients, especially those in the adolescent age group, were not very motivated to comply

Table 1. Recommendations for hand therapy according to disaster operations management stages.

Disaster operations management stage	Aim	Recommendations
Mitigation	This phase aims to prepare for disasters by identifying risks in advance and raising awareness to reduce the potential impacts of disasters and make the community more resilient	• <i>Public education:</i> In disaster-prone countries, raising public awareness is essential. Therefore, organizing multidisciplinary public education programs may be useful. These educations should include teaching early intervention skills for disasters and information on the post-disaster rehabilitation process
Preparedness	This phase aims to establish the necessary infrastructure, training, and resources for a rapid and effective response to disasters, ensuring the enhancement of healthcare professionals' knowledge and skills in preparation for post-disaster treatment	• <i>National network:</i> Since earthquake injuries in the upper extremities are complex, more than basic hand therapy knowledge is needed to achieve optimal treatment for these patients. Therefore, a national information-sharing system could be established to support therapists treating earthquake victims. Training programmes in hand therapy should be organised, and a database of trained clinicians' contact information would serve as a valuable resource for finding qualified professionals • <i>Training for health professionals:</i> Organizing training programs on wound care, disaster response, and emergency procedures for therapists is important. Such training should enhance their skills in managing complex injuries during emergency conditions like disasters • <i>Splinting:</i> All patients in this study required splinting. Mobile splint production centres with trained personnel should be established. Additionally, 3D printing technology can be utilised to produce custom-made splints, enabling a faster response after disasters
Response	This phase aims to mobilize all available resources to effectively deliver healthcare and other critical services in the affected areas during a disaster, ensuring rapid assistance to the community	• <i>On-site or teleconsultation:</i> A platform can be developed where clinicians in the disaster area can collaborate with experienced specialists remotely to ensure optimal patient treatment using interdisciplinary approaches. Healthcare workers can be trained on trauma-informed care • <i>Telerehabilitation:</i> The earthquake zone could have no access to professional healthcare. Through telerehabilitation services, patients can come together with physiotherapists, psychologists and social workers • <i>Integration with cardiopulmonary rehabilitation:</i> Cardiopulmonary complications, particularly pulmonary issues from repeated general anaesthesia, are common among earthquake victims. Additionally, prolonged bed rest due to a lack of mobility guidance increases the risk of cardiovascular problems. Therefore, establishing mobile therapy teams and integrating hand therapy with cardiopulmonary rehabilitation can help mitigate the negative effects of immobility and improve recovery outcomes

(continued)

Table 1. (continued)

Disaster operations management stage	Aim	Recommendations
Recovery	This phase aims to restore society post-disaster and initiate a sustainable recovery by addressing the physical, psychological, and social needs of individuals. Additionally, it includes the provision of long-term rehabilitation services	• <i>Psychosocial Support and Rehabilitation:</i> Physical and psychological recovery are equally important in the post-disaster period. Collaboration with social workers and psychologists can support survivors' reintegration into society. Telerehabilitation services should be extended for continued physiotherapy during long-term recovery • <i>Advanced Healing Tools:</i> Newer technologies (such as virtual reality and robotic rehabilitation) can be used for healing in disaster areas. Mobile physiotherapy centres can be made permanent. Group exercises can be organized to contribute to the physical and emotional well-being of patients

with the treatment. Additionally, this earthquake occurred in one of Türkiye's regions with the highest refugee population. As a result, language barriers posed a significant challenge in delivering effective rehabilitation. In some instances, therapy sessions were hindered due to the lack of a common language, necessitating the use of translators. Thus, it can be also concluded that communication difficulties likely diminished the overall effectiveness of treatment.

Since hand therapists are not typically trained for emergency response, they may suddenly find themselves unprepared when confronted with a disaster scenario. Therefore, we have formulated a set of recommendations in Table 1 that are considered to contribute to after-disaster healthcare planning with a particular emphasis on hand therapy. Recommendations were formulated based on common challenges encountered during therapy sessions, therapist reflections, and patient feedback.

Disaster Operations Management (DOM) refers to the activities conducted before, during, and after a disaster to mitigate its impact. DOM is categorized into four subfields: mitigation, preparedness, response, and recovery.²⁷ Mitigation encompasses activities aimed at reducing the long-term risk of disasters and alleviating their consequences. Preparedness involves actions taken before a disaster occurs to enable effective response during the event. Response refers to activities conducted after a disaster to serve the affected population and deploy vital resources. Recovery denotes the short- and long-term goals planned to restore the normal functioning of society.²⁸ Drawing from this information, a rehabilitation plan that includes hand therapy for disaster scenarios can be developed by the relevant authorities. The value of early, high-quality, long-term rehabilitation processes for supporting functional recovery, decreased hospital stays, and reduced complications or disability is well recognized.^{24,29,30} Therefore, any kind of rehabilitation services, including hand therapy, are required after major

earthquakes to enhance the recovery from the disaster. Acute, mid-term, and long-term hand therapy strategies should be established to prepare for a future disaster.

Given the complex nature of injuries, a multidisciplinary team—including physiotherapists, occupational therapists, psychologists, social workers and medical doctors—is crucial for optimising functional recovery. Future disaster response plans should integrate structured multidisciplinary rehabilitation teams within early-phase healthcare interventions.

Limitations: This study is limited by its retrospective design, the lack of standardized functional outcome measures and insufficient follow-up of the patients. The chaotic nature of the post-disaster environment and incomplete medical records made it difficult to collect data on patients' conditions before rehabilitation began. Although this study reflects experiences from a single centre and may not reflect the complexities of rehabilitation in the disaster zone, it provides valuable insights into post-disaster healthcare services and contributes to the growing body of knowledge in this field. Another limitation of this study is the limited dataset collected from a specific geographic region and a specific group of earthquake-affected patients. Therefore, the findings may not be directly generalizable to individuals from different age groups, cultural backgrounds, or socioeconomic contexts. Furthermore, while our results provide valuable insights into the rehabilitation of earthquake survivors, they may not be applicable to individuals affected by other types of disasters or undergoing different rehabilitation protocols.

Conclusion

Although various articles and guidelines exist on post-disaster rehabilitation, resources specifically focusing on hand therapy remain limited. We believe that this study

provides a valuable contribution by centring on experiences and recommendations for post-disaster hand rehabilitation, offering practical insights for future disaster response planning.

It is concluded that hand therapy after earthquakes or similar disasters with widespread impacts should include immediate splinting or protective positioning of the hand at the first line. Given that earthquake survivors often present with multiple injuries, rehabilitation must be individualised and delivered through a multidisciplinary team approach.

Based on our experiences, Table 1 outlines recommendations for integrating hand therapy into disaster management strategies, structured according to the Disaster Operations Management framework. These recommendations address key phases of disaster response, including mitigation, preparedness, response, and recovery, with a particular focus on the role of hand therapy within each stage. Hand therapists are encouraged to advocate for the inclusion of rehabilitation services in disaster response plans.

This study focuses on hand therapy in the context of earthquakes. Future studies can focus on hand therapy in larger populations and different disasters, thus contributing to the literature on post-disaster rehabilitation.

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Author contributions

ZE: designing the study, collecting the data, analyzing the data, writing the manuscript, confirming the accuracy of the data and the analyses. ÖG: collecting the data, writing the manuscript. KÇ: designing the study, collecting the data, analyzing the data. All authors reviewed and edited the manuscript and approved the final version of the manuscript.

Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethical statement

Ethical approval

Ethical approval for this retrospective study was obtained from Gazi University Ethics Committee with research code number

2024-1654. This study was conducted in accordance with the Declaration of Helsinki.

Informed consent

Verbal informed consent was obtained from the patients for their anonymized information to be published in this article.

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References

1. Şahin C. Doğal afetler ve Türkiye. *Gündüz Eğitim Ve Yayıncılık*, 2002.
2. Afet ve Acil Durum Yönetimi Başkanlığı. Aletsel Dönem Deprem Kataloğu (1900-Günümüz M_s≥4.0). <https://deprem.afad.gov.tr/event-instrumental> (2025, accessed 13 February 2025).
3. TRT Haber. Kahramanmaraş depremleri ‘Asrın Felaketi’ olarak literatüre girdi (2023, accessed 06 August 2023).
4. *Health Emergency and Disaster Risk Management Framework*. Geneva: World Health Organization, 2019.
5. *Strengthening Rehabilitation in Health Emergency Preparedness, Readiness, Response and Resilience. Policy Brief*. Geneva: World Health Organization, 2023.
6. Harrison RM. Preliminary investigation into the role of physiotherapists in disaster response. *Prehosp Disaster Med* 2007; 22: 462–466.
7. Mulligan H, Smith CM and Ferdinand S. How did the Canterbury earthquakes affect physiotherapists and physiotherapy services? A qualitative study. *Physiother Res Int* 2015; 20: 60–68.
8. Trivedi NS and Rathod PV. Physiotherapy in disaster management: physiotherapist view. *Natl J Integr Res Med* 2017; 8: 32–34.
9. Association S. *The Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response*. 4th ed. Geneva, Switzerland, 2018.
10. Mills J-A, Durham J and Packirisamy V. Rehabilitation services in disaster response. *Bull World Health Organ* 2017; 95: 162–164.
11. Li Y, Reinhardt JD, Gosney JE, et al. Evaluation of functional outcomes of physical rehabilitation and medical complications in spinal cord injury victims of the Sichuan earthquake. *J Rehabil Med* 2012; 44: 534–540.
12. Stucki G, Stier-Jarmer M, Grill E, et al. Rationale and principles of early rehabilitation care after an acute injury or illness. *Disabil Rehabil* 2005; 27: 353–359.
13. *Rehabilitation in Health Systems*. Geneva: World Health Organization 2017.
14. *Classification and Minimum Technical Standards for Emergency Medical Teams*. Geneva: World Health Organization, 2021.

15. Physiotherapy W. Policy statement: disaster management. <https://world.physio/policy/ps-disaster-management>, 2023.
16. Gohy B, Ali E, Van den Bergh R, et al. Early physical and functional rehabilitation of trauma patients in the Médecins Sans Frontières trauma centre in Kunduz, Afghanistan: luxury or necessity? *International Health* 2016; 8: 381–389.
17. World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *Jama* 2013; 310: 2191–2194.
18. Afet ve Acil Durum Yönetimi Başkanlığı. Türkiye Afet Müdahale Planı. <https://www.afad.gov.tr/turkiye-afet-mudahale-planı#> (2022, accessed 17 February 2025).
19. Armitage RC and Dexter C. Turkey and Syria earthquakes: frontline insights of primary care physiotherapy. *Physiotherapy* 2023; 121: 21–22.
20. Association NP. *The Role of Physical Therapists in the Medical Response Team Following a Natural Disaster: Our Experience in Nepal*. Alexandria, VA: JOSPT, Inc. JOSPT, 1033 North Fairfax Street, Suite 304, 2015, pp. 644–646.
21. Rrecaj-Malaj S and Qorolli M. Outcome of combined physiotherapy treatment with dynamic splinting in patient with traumatic hand injury: a case report. *Journal of Physical Education and Sport* 2024; 24: 1561–1568.
22. Santacreu ES, Cabezas NV and Graupera AB. Combined treatment with paraffin, manual therapy, pegboard and splinting in a patient with post-traumatic stiff hand. *Arch Physiother* 2016; 6: 14.
23. Sim G, Fleming J and Glasgow C. Mobilizing orthoses in the management of post-traumatic elbow contractures: a survey of Australian hand therapy practice. *J Hand Ther* 2021; 34: 90–99.
24. Edgar DW, Wood F and Goodwin-Walters A. First response, rehabilitation, and outcomes of hand and upper limb function: survivors of the Bali bombing disaster. A case series report. *J Hand Ther* 2006; 19: 283–298.
25. Resnick L. *It Takes a Team—The 2013 Boston marathon: Preparing for and Recovering from a Mass-Casualty Event*. Needham, MA: JBJS and JOSPT, 2014, pp. 1–68.
26. Cénat JM, McIntee S-E and Blais-Rochette C. Symptoms of posttraumatic stress disorder, depression, anxiety and other mental health problems following the 2010 earthquake in Haiti: a systematic review and meta-analysis. *J Affect Disord* 2020; 273: 55–85.
27. McLoughlin D. A framework for integrated emergency management. *Public Administration Review* 1985; 45: 165–172.
28. Galindo G and Batta R. Review of recent developments in OR/MS research in disaster operations management. *European Journal of Operational Research* 2013; 230: 201–211.
29. Reinhardt J, Zhang X, Chen S, et al. Long-term effectiveness of rehabilitation services delivery for Wenchuan earthquake survivors with impairments over a 4-year period: a prospective cohort study. *BMJ Open* 2022; 12: e057158.
30. Rozinov V, Spivak B and Nikogosian R. Rehabilitation of disabled children who suffered during earthquakes. *Prehosp Disaster Med* 1999; 14: S33–S34.