ORIGINAL ARTICLE

# The observations and experience of the Surgical Disaster Response Team from Ankara Etlik City Hospital in the earthquakes of February 6, 2023 in Türkiye

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## ABSTRACT

**BACKGROUND:** Two major earthquakes struck southeastern Türkiye consecutively on February 6, 2023. On the same day, a Surgical Disaster Response Team was immediately formed at Ankara Etlik City Hospital and deployed to the affected region, where they worked for seven days at Hatay-Reyhanlı State Hospital. The aim of this study was to present the experiences, data, and recommendations of the Ankara Etlik City Hospital Surgical Disaster Response Team following the February 6, 2023 earthquakes.

**METHODS:** Data were collected from the individual records of the physicians in the Surgical Disaster Response Team. The physicians provided information about the units in which they worked, their roles, the procedures they performed, treatments administered, observations made, experiences encountered, and recommendations for future disaster response efforts.

**RESULTS:** The anesthesiologists in the team worked in the operating theatres and intensive care units. In addition to performing surgical procedures, the cardiovascular surgeon, general surgeons, and pediatric surgeon also assisted in the emergency department's red and yellow zones as needed. The orthopedic surgeons performed 96 interventions, the neurosurgeon 11, the cardiovascular surgeon five, the general surgeons four, and the pediatric surgeon four. Of the total procedures, 80% were performed by orthopedic surgeons, while the remaining 20% were carried out by specialists from other surgical branches.

**CONCLUSION:** Extremity injuries are common among earthquake survivors and usually require orthopedic intervention. In a hospital where the administrative staff are also disaster victims, management should be assumed by the incoming disaster response team. A detailed disaster preparedness plan must outline which regions will provide support, including personnel, transportation, materials, and patient referrals, to specific disaster-affected areas. In addition to surgeons, the disaster response team must include emergency medicine specialists, internal medicine specialists, pediatricians, and gynecologists. The Surgical Disaster Response Team should be a fully integrated unit consisting of doctors, nurses, and auxiliary personnel.

**Keywords:** Earthquake; trauma; disaster medicine; crush injury; Türkiye.

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## INTRODUCTION

Two major earthquakes, measuring 7.7 and 7.6 in magnitude, struck consecutively on February 6, 2023, with epicenters in Pazarcık and Elbistan in the southern province of Kahramanmaraş, Türkiye. Approximately 50,000 lives were lost, more than 200,000 people were injured, and millions of citizens were affected.[1] On the same day, a Surgical Disaster Response Team was established at Ankara Etlik City Hospital and mobilized to the affected region under the coordination of the Ministry of Health. The team consisted of two anesthesiologists, one cardiovascular surgeon, one orthopedic surgeon, one pediatric surgeon, one neurosurgeon, two general surgeons, two operating theatre nurses, and a team leader experienced in disaster and emergency response. The Ankara Etlik City Hospital Surgical Disaster Response Team arrived in Antakya on the evening of 6 February and reached Hatay-Reyhanlı State Hospital at 21:00 hours. This hospital was one of only two in the Hatay province capable of performing surgery. The team worked there for seven days.

During earthquakes, there is an immediate and overwhelming surge in patient presentations. However, local healthcare facilities and personnel are often also affected by the disaster.[2] Therefore, the healthcare system must respond effectively to the emergency and the increased demand for medical services.[3] Rapid and effective medical and surgical interventions are critical after an earthquake to reduce mortality and prevent the loss of organs and extremities.[4] In such large-scale disasters, the data, experiences, observations, and recommendations recorded by healthcare personnel play a crucial role in planning and preparing for future disasters.[5-7] The aim of this study was to present the experiences, data, and recommendations of the Ankara Etlik City Hospital Surgical Disaster Response Team during the first seven days following the earthquakes of February 6, 2023.

## MATERIALS AND METHODS

Following the earthquake, there was no electricity network in Hatay-Reyhanlı, and internet services collapsed. However, Hatay-Reyhanlı State Hospital had electricity supplied by a generator, allowing imaging and laboratory services to remain operational. However, the hospital information management system was not functional as it was dependent on internet access. Consequently, digital records could not be obtained. During the earthquake response period, records were documented on paper and kept in patient files.

Due to a shortage of personnel and the transfer of some files with referred patients, not all records were available during the earthquake response. The data for this study were obtained from the individual records of the physicians in the Ankara Etlik City Hospital Surgical Disaster Response Team. Each physician was questioned regarding the unit in which they worked during the earthquake response from 6 to 13 February 2023, their working shifts, procedures performed, treatments administered, observations, experiences, and recommendations.

Approval for the study was granted by the Ankara Etlik City Hospital Scientific Research and Evaluation Ethics Committee (Approval Number: AEŞH-BADEK-2024-501, Date: 14.08.2024).

## RESULTS

On arrival at the Hatay-Reyhanlı State Hospital, the Emergency Department (ED) was overcrowded with trauma patients and other emergency cases due to the earthquake. There were two general practitioners in the ED, but no facilities for consultation or referral. The number of nurses in the ED was limited, and although there was electricity, the patient registration system was not operational. The inpatient wards had visible structural damage, including cracks in the walls and falling plaster. Most inpatients had left the hospital on their own. The hospital's operating theatres had four surgical tables, all of which were functional. Patients in the Intensive Care Unit (ICU) continued to receive treatment, but with only a limited number of available personnel. Local hospital staff, including physicians, were directly affected by the earthquake and were unable to fulfill their duties. Two specialist physicians had died under the rubble. Many staff members had injured and deceased family members and had lost their homes and shelter. The impact of the earthquake on hospital administrators resulted in a lack of effective hospital management.

Materials in the operating theatres were examined, and the local operating theatre personnel who were available for duty were called in to prepare the theatres quickly. In the ED, a 2.5-year-old child had been waiting for approximately 16 hours with a crush injury to the left lower extremity. Ischemia had developed in the affected limb, and as the patient's general condition was rapidly deteriorating, a multidisciplinary discussion concluded that emergency transfer was not feasible. It was decided to proceed with surgery. Despite femoral artery repair, the ischemia did not resolve, necessitating disarticulation. Postoperatively, the patient's general condition improved, and at the first opportunity on the first postoperative day the patient was transferred to an advanced medical center. Aid teams from other hospitals in Ankara arrived in Hatay-Reyhanlı in the following hours.

During the first night, orthopedic and anesthesia specialists performed surgeries in the operating theatres. Other physicians evaluated primary emergency patients in the ED, worked as consulting physicians throughout the night, and assisted in surgical procedures as needed. The inpatient wards were cleaned and prepared in phases, and local personnel who were able to work were called back to the hospital. Postoperative patients and new arrivals at the ED began to be admitted to inpatient wards and ICUs. From the second day,

a structured work schedule was established in coordination with physicians arriving from other hospitals. Twelve-hour shifts were initially implemented on the second day, but from the third day onward, they were reduced to eight-hour shifts. When necessary, physicians on rest periods were recalled to assist as needed.

Upon the arrival of the Ankara Etlik City Hospital Surgical Disaster Response Team at Hatay-Reyhanlı State Hospital, there was no emergency medicine specialist on duty, and only two general practitioners were working in the ED. At that time, on the first night, team members who were not actively performing surgeries immediately took over the management of the emergency department's red and yellow zones, evaluating patients and administering treatments (Table 1). The ED had facilities for direct radiographs, laboratory services, and computed tomography; however, in the absence of a radiologist, each branch physician conducted their own radiological evaluations. Electrolyte imbalances due to trauma, hypothermia, dehydration, and crush syndrome were treated in the ED. In addition to trauma-related conditions, medical issues arising from chronic diseases, urinary tract infections, hypothermia, upper respiratory tract infections, pneumonia, and gastroenteritis were also managed. When necessary, patients were admitted to the operating theatres, inpatient wards, or the ICU. Anesthesiologists managed the ICUs and administered treatments. In addition to their responsibilities in the ED and operating theatres, each specialist physician served as a consulting physician. When opportunities arose, patients were transferred to higher-level hospitals. The details of the physicians and their areas of work are shown in Table 1.

**Table 1.** Physician work areas

| Specialty | Operating Theatre | Emergency Department | Consultation | Intensive Care Unit |
|---|---|---|---|---|
| Orthopedic Surgery | + | | | |
| Neurosurgery | + | | + | |
| Cardiovascular Surgery | + | + | + | |
| General Surgery | + | + | + | |
| Anesthesia and Reanimation | + | | | + |
| Pediatric Surgery | + | + | + | |

**Table 2.** Surgical interventions performed

| Specialty | Procedure | Number of Cases |
|---|---|---|
| Orthopedic Surgery | Lower extremity amputation | 30 |
| | Upper extremity amputation | 5 |
| | Debridement and fasciotomy approach/closure | 35 |
| | Fasciotomy | 20 |
| | Elbow terrible triad repair | 1 |
| | Lower and upper extremity fracture fixation | 5 |
| Neurosurgery | Scalp defect repair | 2 |
| | Lumbar stabilization | 5 |
| | Decompressive craniectomy | 2 |
| | Epidural hematoma drainage | 1 |
| | Parenchymal hematoma drainage | 1 |
| Cardiovascular Surgery | Vascular repair for acute extremity ischemia due to crush injury | 2 |
| | Hemothorax/Pneumothorax –Tube thoracostomy | 3 |
| | Central venous catheter placement | 20 |
| General Surgery | Acute abdomen – Ostomy creation | 2 |
| | Appendectomy | 2 |
| Pediatric Surgery | Acute abdomen – Explorative laparotomy with devolvulation | 1 |
| | Hemothorax/Pneumothorax – Tube thoracostomy | 3 |

During the period of operation at Hatay-Reyhanlı Devlet Hospital, 96 surgical interventions were performed by orthopedic surgeons, 11 by the neurosurgeon, five by the cardiovascular surgeon, four by the general surgeons, and four by the pediatric surgeon. Of the total procedures, 80% were carried out by orthopedic surgeons, while the remaining 20% were performed by specialists from other surgical branches. Additionally, other interventional procedures such as central venous catheter placement and intubation were performed. The details of the operations conducted by the Ankara Etlik City Hospital Surgical Disaster Response Team are provided in Table 2. On February 13, 2023, after completing the seven-day mission, the initial team members returned to Ankara Etlik City Hospital and were replaced by newly deployed physicians.

## DISCUSSION

Head and trunk injuries in earthquake-related trauma are more fatal, while survivors who reach hospitals tend to present with more extremity injuries.[8] Most surgical procedures performed on earthquake victims are orthopedic interventions.[5,9-11] In alignment with data from previous reports, 80% (n=96) of the 120 operations performed by the Ankara Etlik City Hospital Surgical Disaster Response Team during the seven-day acute phase were orthopedic surgeries.

Hospital management and personnel in disaster zones are often also earthquake victims, making it unrealistic to expect them to fulfill their duties and coordinate effectively. Upon arrival at Hatay-Reyhanlı State Hospital, the Ankara Etlik City Hospital Surgical Disaster Response Team observed significant weaknesses in management and a lack of coordination. In such situations, it is crucial that a leader from within the Surgical Disaster Response Team is pre-designated and actively manages coordination.[3] Hospital management by the incoming disaster response team enables a rapid, structured, and coordinated healthcare response during crises. In disaster scenarios, an excessive number of personnel may gather due to the influx of volunteers. This can lead to chaos and rapid depletion of energy among all personnel in the initial hours, making medical aid unsustainable.[5,11] To address this, the team leader should organize the division of labor, establish working hours, and assign specific roles to ensure the long-term sustainability of high-quality healthcare services under challenging physical conditions.

Türkiye has a pre-established Disaster Intervention Plan, with response strategies designed based on regions and provinces.[12] However, due to the vast area affected by the 2023 earthquake (spanning 10 provinces), many of the designated support provinces were also impacted.[13] Therefore, disaster response planning should include separate contingency plans for aid from both nearby and distant regions. There should be detailed pre-planning regarding what type of support (personnel, transportation, materials, and patient transfers) will come from which regions to affected disaster zones.[6,14] Matched clinics designated to provide support should be pre-determined, and communication channels should be established before a disaster occurs. The Disaster Intervention Plan for Türkiye should be expanded and revised. All hospitals should develop their own disaster plans, conduct drills at regular intervals, train personnel, and address any deficiencies.[5,13,15] In secondary- and tertiary-level hospitals, disaster planning and practice drills should be implemented within each clinic.[6] The preparation of a hospital emergency response guide is essential to enable aid teams arriving from outside the disaster zone to work effectively without local personnel and to quickly locate vital equipment and materials.

The Ankara Etlik City Hospital Surgical Disaster Response Team was composed of surgeons, anesthesiologists, and nurses. At Hatay-Reyhanlı State Hospital, treatment was provided for electrolyte imbalances due to crush syndrome, dehydration, and hypothermia, in addition to trauma-related surgeries. Furthermore, due to the lack of access to food, clean water, and shelter, many other medical conditions were treated, including gastroenteritis, pneumonia, upper respiratory tract infections, urinary tract infections, and exacerbations and complications of chronic diseases. It is well known that the prevalence of non-trauma-related illnesses in earthquake zones intensifies after the third day, with infectious diseases increasing due to environmental factors.[7,16-18] Therefore, disaster response teams must include emergency medicine specialists for ED management, internal medicine specialists for the treatment of medical conditions, pediatricians for the care of children presenting with non-trauma-related illnesses, and gynecologists for pregnant patients and emergency deliveries.[4,19]

Other than the physicians, only two operating theatre nurses were included in the Ankara Etlik City Hospital Surgical Disaster Response Team. From the moment they arrived at the hospital, they quickly took the initiative to locate necessary materials and prepare the operating theatres. However, there was also a need for nurses in the inpatient wards and the ICU. The team experienced a shortage of personnel responsible for cleaning, as well as for the transfer of patients and materials in the operating theatres and wards. In disaster situations, auxiliary healthcare personnel are just as essential as doctors in restoring the hospital to a functional state capable of providing medical care.[3] Forming an aid team consisting solely of doctors is insufficient. Surgical disaster response teams must be fully integrated, comprising doctors, nurses, and auxiliary personnel.

## CONCLUSION

Extremity injuries are the most common type of injury among earthquake survivors, with most requiring orthopedic surgery. A designated leader must be selected from within the disaster response team to assume hospital management, as administrators in the disaster zone are often also earthquake

victims. Detailed planning must be conducted regarding the support provided, including personnel, transportation, materials, and patient transfers, and which regions will be responsible for aiding specific disaster-affected areas. The preparation of an emergency response guide for aid teams arriving at hospitals during a disaster is highly beneficial. In addition to surgeons, disaster response teams should include emergency medicine specialists, internal medicine specialists, pediatricians, and gynecologists. A Surgical Disaster Response Team must be a fully integrated unit comprising doctors, nurses, and auxiliary personnel.

**Ethics Committee Approval:** This study was approved by the Ankara Etlik City Hospital Scientific Research and Evaluation Ethics Committee Ethics Committee (Date: 14.08.2024, Decision No: AEŞH-BADEK-2024-501).

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**Conflict of Interest:** None declared.

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ORİJİNAL ÇALIŞMA - *ÖZ*

## 6 Şubat 2023 depremlerinde Ankara Etlik Şehir Hastanesi cerrahi afet takımının tecrübe ve gözlemleri

AMAÇ: 6 Şubat 2023 tarihinde Türkiye'nin güney illerinde ard arda iki büyük deprem meydana geldi. Aynı gün Ankara Etlik Şehir Hastanesinde derhal bir cerrahi afet takımı kuruldu ve bölgeye intikal ederek Hatay-Reyhanlı Devlet Hastanesinde 7 gün çalıştı. Bu çalışmanın amacı Ankara Etlik Şehir Hastanesi Cerrahi Afet takımının 6 Şubat 2023 depremlerindeki verileri, tecrübesi ve önerilerini sunmaktır.

GEREÇ VE YÖNTEM: Veriler Cerrahi afet takımındaki hekimlerin kişisel kayıtlarından elde edilmiştir. Hekimlere çalıştığı birimler, çalışma şekilleri, yaptığı ameliyatlar, tedaviler, gözlemler, tecrübeler ve önerileri soruldu.

BULGULAR: Anestezistler ameliyathanede ve yoğun bakımlarda çalıştı. Ameliyatların yanında acildeki ihtiyaç nedeniyle kalp damar cerrahı, genel cerrahlar ve çocuk cerrahı acil servis kırmızı ve sarı alanda çalıştı. Ortopedi 96, beyin cerrahi 11, kalp-damar cerrahisi 5, genel cerrahi 4, çocuk cerrahi 4 cerrahi girişimde bulundu. Ameliyatların %80'i ortopedi, %20'si ise diğer branşlar tarafından gerçekleştirilmiştir.

SONUÇ: Yıkıntıdan yaralı kurtarılanlarda ekstremite yaralanması sıktır, çoğunlukla ortopedik girişim gerekli olur. Yöneticileri de deprem mağduru olan hastane yönetimi yeni gelen afet takımı tarafından üstlenilmelidir. Hangi bölgedeki afete, hangi bölgenin, ne desteği vereceği (personel, taşıt, malzeme, hasta sevklerini karşılama) ayrıntılı bir şekilde hazırlanmalıdır. Afet takımlarına cerrahlara ek olarak acil tıp uzmanları, iç hastalıkları uzmanları, pediatristler, jinekologlar dahil edilmelidir. Cerrahi afet takımları doktor, hemşire ve yardımcı personelden oluşan tam tekmil bir takım olmalıdır.

Anahtar sözcükler: Deprem; travma; afet tıbbı; ezilme yaralanması; Türkiye.

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