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Evaluation of the Orthopedic Traumas in the Earliest Days of the 2023 Kahramanmaraş Earthquakes

2023 Kahramanmaraş Depremlerinin İlk Günlerindeki Ortopedik Travmaların Değerlendirilmesi

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ABSTRACT

In this editorial article, we endeavor to describe our experiences concerning earthquake victims with orthopedic injuries in a secondary hospital in one of the epicenters in the immediate post-quake period.

Key Words: Kahramanmaras earthquakes, Musculoskeletal injury, Orthopeadic trauma. Disaster Organisiation. Experience

ÖZET

Bu editöryal yazıda, depremin hemen sonrasında depremin merkez üslerinden biri olan ikinci basamak bir hastanede deprem mağdurlarında gözlemlediğimiz ortopedik yaralanmalar ile ilgili deneyimlerimizi paylaşmaya çalışacağız.

Anahtar Kelimeler: Kahramanmaraş depremleri, Kas-iskelet yaralanması, Ortopedik travma, Afet organizasyonu, Deneyim

Two devastating earthquakes (magnitudes of 7.7 and 7.6), whose epicenters were in the Pazarcık and Elbistan districts of Kahramanmaraş in Türkiye, struck on 6 February 2023. According to the World Health Organization, the affected regions of Türkiye and Syria are home to approximately 23 million people, 1.4 million of them children. According to official figures, at least 50,783 people in Türkiye and 8,476 in Syria lost their lives due to these quakes, while more than 122,000 were injured. In addition, more than half a million buildings were damaged, including homes, hospitals, schools, and public buildings, and some two million people were forced to migrate due. According to official records, the earthquakes centered in Kahramanmaraş resulted in the greatest loss of life and material damage of all quakes in the history of the Turkish Republic [1-5]. The country's ancient cities, the place where I was born and raised, and we ourselves were all devastated.

Many injuries among earthquake survivors are orthopedic, so orthopedic surgeons play a crucial role in providing care for victims. Earthquake injuries can range from simple soft tissue damage to closed or open fractures, compartment or crush syndrome, spinal and pelvic fractures, and even life-threatening polytrauma. These injuries may require simple splints or debridement, fasciotomy, amputation, or complex surgical treatment of fractures. The basic functions of the orthopedist are to save life and limb through rapid diagnosis and treatment while identifying emergency situations, with the application of damage-control orthopedic surgery principles and a multidisciplinary approach.

Understanding the epidemiology and treatment of orthopedic injuries following an earthquake is essential for planning effective interventions [6-8]. However, such activity in an earthquake is highly problematic. In addition, the fact that volunteer health workers who take over the relevant departments in hospitals all come from different schools and systems, and differences among institutions in terms of branch units and job descriptions, can result in difficulties

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among the workers themselves and in communications with coordinating centers [5]. In this editorial article, we endeavor to describe our experiences concerning earthquake victims with orthopedic injuries in a secondary hospital in one of the epicenters in the immediate post-quake period.

The moment we heard of the devastating scale of the disaster, we immediately went to Elbistan, the epicenter of the second quake, as a group of volunteer physicians and other health personnel. We immediately began working with orthopedists, other physicians, and other health and administrative personnel working in the health institution in Elbistan. We once established a system of the organization together with Orthopedist Colleagues who arrived subsequently. The collaboration and coordination that quickly developed among the orthopedists arriving at the hospital on a volunteer basis and those on the permanent staff included the following components:

- The most senior orthopedist in terms of age and experience coordinated the emergency unit, ward, intensive care, and operating room teams. As the head of this new, spontaneously established clinic, he also organized the working arrangements of the other orthopedic specialists.
- The hospital's resources were rapidly reviewed through meetings with the hospital management. The requisite communication groups were established with specialists from other branches and auxiliary health personnel, particularly emergency medicine, intensive care, anesthesia, and nephrology specialists.
- The cases evaluated with the team in the emergency department were reviewed on the operating table, and rapid decisions concerning debridement, fasciotomy, amputation, or external/internal fixation were taken with mini-councils at the bedside. Surgical interventions were also performed with the same rapidity.
- Collaboration was established with multiple teams and anesthesia specialists simultaneously in the operating room. Cases were again evaluated at the bedside. Decisions regarding amputation/limb salvage, especially in pediatric cases, were based on the opinions of three or more physicians.
- Postoperative patients were followed up in intensive care or on the ward. The patients were again re-evaluated at periodic visits. General status, extremities, wound care, and all treatments were reviewed. Use was made of drugs, equipment, hemodialysis, and all available means.
- Since materials ran out on the first day, contact was made with implant firms in the region, and efforts were made to obtain as much orthopedic equipment as possible. A national implant provider, which originated in Gaziantep (*Zimed® Medical*), went the extra mile and exhibited the highest level of generosity to ensure that the requisite orthopedic implants were obtained.
- The allocation of wards to patients with orthopedic injuries was carried out in a coordinated manner. Less busy physicians were charged with the medical management and the clinical follow-ups of these patients. Orthopedic teams worked in the specified units on a rotating basis. Groups were established over social networks for group communications. At the same time, the treatment of almost 200 patients was organized over four floors.
- In order to reduce density in the clinic that resulted from referrals based on the hospital's bed capacity, patients who received first aid and emergency treatment and whose conditions permitted this were transferred to hospitals in surrounding provinces in coordination between the hospital management and the 112 emergency service.
- Once their acute conditions had subsided, patients were followed-up in a out-patient clinic. In the event that further surgical intervention was required, patients were either re-admitted or transferred to other centers. Patients were transferred as much as possible to ensure that only emergency and chronic patients were treated.

Based on our experiences, the main principles of the treatment of orthopedic injuries at the time of the earthquake involved the following:

- Life-threatening conditions were treated with the debridement of salvageable and amputation of non-salvageable limbs.
- Limb salvage in case of open fractures was performed with extensive debridement, limb shortening if required, external fixation with local coverage, and broad antibiotic coverage, followed by second and third debridement procedures.
- A significant proportion of closed fractures were treated conservatively, accepting some degree of displacement and deformity.
- Some procedures, such as first-day debridement and fasciotomy in a few cases, were carried out in the emergency department due to the high intensity in the operating room. Surgical procedures with internal and/or external implants were carried out under maximal sterile conditions under anesthesia in the current active operating rooms.
- Some cases of compartment syndrome were regarded as chronic. However, in many cases, compartment syndrome also entailed crush syndrome and frostbite findings. Priority fasciotomy and debridement were applied to the greatest extent possible in these cases. Hemodialysis facilities were employed as much as possible before deciding on amputation, particularly in pediatric or young patients with crush syndrome.

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- Whether or not soft tissues were infected and/or devitalized was carefully re-evaluated during the intraoperative period. Muscular contractility and color were also checked (4C rule). Amputations, particularly in children and the young, were performed on a limited basis, and only in case of totally devitalized limbs.
- Whether the patient was a child, young, or elderly, upper or lower extremity involvement, other accompanying injuries, and general vital functions were considered during the decision to amputate.
- Closed fractures requiring surgery, including those of the pelvis and acetabulum, were successfully treated with internal fixation wherever possible.

Turkish orthopedists worked with enormous self-sacrifice in the field and hospitals where patients were transferred during the Kahramanmaraş-centered earthquakes. They immediately hastened to the field after the quakes in the light of both institutional and personal initiatives. They worked untiringly, despite encountering major difficulties in terms of transport, in the field, and subsequently. They described their problems and experiences on the 'Türk-ortopod' mail group, online discussion groups, and regional and national scientific assemblies. An extensive earthquake session was held at the Bone Joint 2023 Congress (Antalya,3-6 May 2023). Other important activities were organized by the Turkish Society of Orthopaedics and Trauma (TOTBİD), the Turkish Association of Orthopedics and Traumatology (TOTDER), The Association of Bone and Joint Surgery (KECD), the Turkish Society for Surgery of the Hand and Upper Extremity (TEÜECD), and others.

Various problems experienced in and outside the hospital after previous earthquakes in Turkey had previously been reported. The transportation to the region of health and rescue teams, communications between the field, in the hospital, and between hospitals, triage, and patient record problems, physical shortages, increased presentations to the emergency department among patients who were not victims of the quakes, and problems with patient transportation and referral were all described. The importance of organization, coordination, education, and preparation was also emphasized [8-11]. All-round readiness for earthquakes is essential to reduce loss of life to a minimum and maximize early recovery [3-5,12].

Despite their devastating nature, the earthquakes we experienced also serve as an essential learning tool for all of us. We must develop more beneficial and appropriate approaches by combining our work and knowledge in a spirit of solidarity. We must transform our personal experiences into events that allow ourselves and our profession to grow. We can only learn from each other. As orthopedic trauma surgeons, it is incumbent upon us to transfer such valuable knowledge and experience to scientific publications. If the demographic characteristics, clinical outcomes, and injuries of presenting victims are known, it may be useful to report these for the purpose of developing policies aimed at preparedness for future earthquakes, response, recovery, and reducing losses caused by natural disasters. An effective disaster assistance program, using a good communication and organization strategy may also be useful in minimizing the damage caused by earthquakes [3,4,12-15].

In conclusion, I once again extend my sincere thanks and admiration to my orthopedic and traumatology colleagues working in the field and hospitals where the victims were transferred following the Kahramanmaraş-based earthquakes. I think it is of the greatest importance for our colleagues to share and report their experiences. Finally, I extend my deepest condolences to our colleagues and fellow citizens who lost their lives in these quakes.

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Figure 1. The orthopaedic surgeons who worked in the Elbistan State Hospital during the Kahramanmaraş earthquakes. The photo belongs to 4th day of the earthquake.

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