

## A MODEL SUGGESTION FOR TRAUMA AND PSYCHOLOGICAL PROCESS LIVING PEOPLE AFTER EARTHQUAKE

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**Abstract:** In geology, "Earthquake" refers to the shaking of the earth's surface caused by the spreading of seismic waves suddenly resulting from breaks in the earth's crust. In fact, an earthquake is a natural phenomenon that shows that everything on earth deemed immobile by people can be damaged. Unfortunately, are people not only unfamiliar with nature but also in the habit of underestimating it. 92% of Turkey is located in the seismic belt. What is more, 95% of the population, 98% of the industrial centers and even 93% of the dams are located in the seismic belts. Since the Erzincan earthquake that took place on December 26, 1939, 1139 people have lost their lives, 2543 people have been injured and 7049 buildings have been completely destroyed every year on average and a devastating earthquake has occurred once every 1.1 years. Although there is not much to do when faced with the reality of earthquakes in Turkey, at the core of this study is an enquiry into a model which will be a guideline for earthquake survivors moving forward with their lives and psychological support provided to them by professionals. The purpose of this model is to assist earthquake survivors to rebuild their post-earthquake private and social lives.

**Keywords:** Earthquake, Natural Phenomenon, Survival, Psychology, Social Life

### Introduction

Earthquakes that cause loss of life and property are the mass movements on the mantle of the earth caused by the flow of earth's internal heat to the surface which leads to breaks in the earth's thin crust.

Scientific studies on the prediction of earthquakes have continued in parallel with the speed of technological development for 76 years, particularly after the 1939 Erzincan Earthquake. Changes in groundwater levels and the amount of radon gas and differences in the static electric field reinforce the physical basis for earthquake prediction especially before major earthquakes. The 7.3-magnitude earthquake which hit China in 1975 was predicted based on the observed clues and many people's lives were saved. In addition, the Japanese Meteorological Agency announced that there could be an earthquake 90 minutes before the 7-magnitude earthquake in 1978 in Izu Oshima which survived it with minimum damage.

Historical (before 1900) and instrumental (after 1900) earthquake records indicate that throughout history there have been many quakes in Izmir and its immediate vicinity which contain many active faults. The impact on buildings of seismic waves of medium-sized earthquakes that occur on these faults will be amplified by the unsuitable conditions of the metropolitan area in terms of settlement. It is, therefore, inevitable that many buildings will be damaged by a possible earthquake e.g. an earthquake of magnitude 5.5. In addition, landslide sites will be at greater risk as was the case in İzmir earthquake in 1977.

### Model Creation Method

Even if it is impossible to prevent the occurrence of this natural phenomenon, it will be possible to live with the reality of earthquakes when we realize the important role they play in the evolution of the earth. For this purpose, potential seismicity can be determined by multidisciplinary studies (e.g. Geological, Geophysical, Construction, Psychological Consultancy etc.).

### Sampling and Study Group

Awareness-raising activities titled "Basic Disaster Consciousness" were carried out in İzmir and its immediate vicinity between 2007 and 2011 under the leadership of Izmir Governorship and in cooperation between Dokuz Eylül University, Institute of Marine Sciences and Technology and some public institutions and organizations. These awareness-raising activities have been continuing individually in accordance with the requests of

institutions since 2012. Within the scope of these studies, lectures were given at all levels of educational institutions, at public institutions, private companies of importance and places deemed appropriate by local authorities in villages. Different experts from the same occupational groups attended these lectures each time.

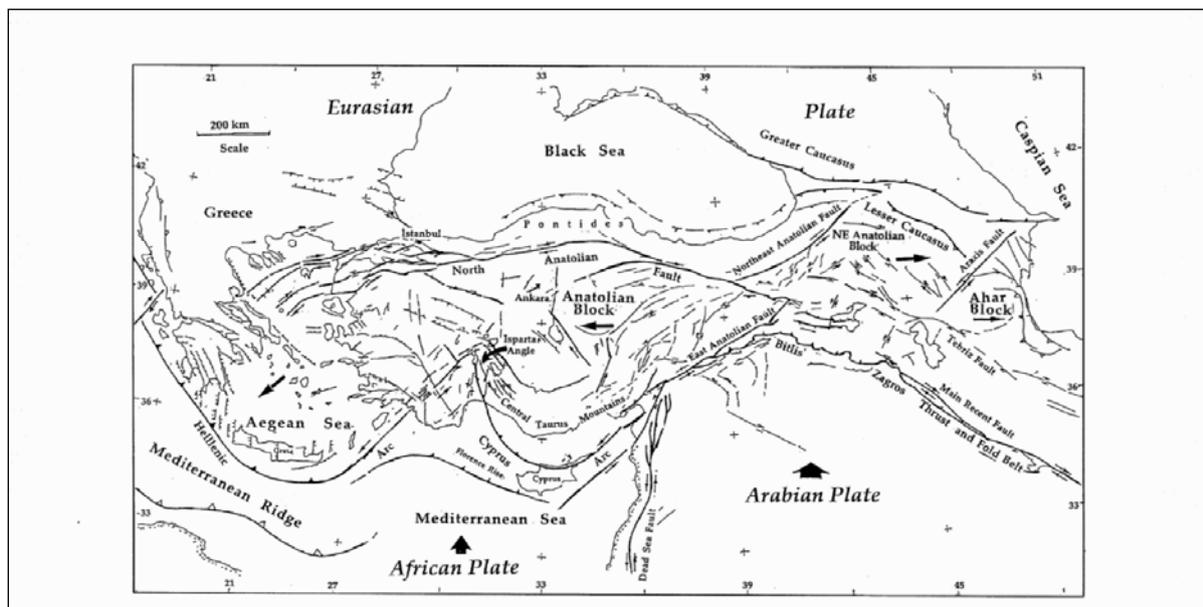
In the presentations, firstly, academicians addressed the question “what is an earthquake?” and explained the risk of earthquakes in Turkey in general and seismicity in İzmir in particular. Secondly, experts from the Chamber of Civil Engineers presented some information together with some visual elements pertaining to the current condition of “Our Buildings” and addressed the question “What Should We Do about Our Buildings?” Thirdly, expert trainers assigned by the Izmir Provincial Civil Defense Directorate shared their knowledge and experiences within the context of “What Should We Do before, during and after an Earthquake?” Lastly, psychiatrists and psychologists who are specialized in the fields of normalization of and psychosocial support for post-earthquake life delivered speeches and discussed these issues with attendees in a conversational tone.

### Data Collection Tools and Application Methods

Due to the fault systems, large-and-small breaks and fractures, there have been and will be many destructive earthquakes in Turkey which is located in the middle of the active seismic belt of Alp-Himalaya. The most destructive earthquakes in Turkey occurred in Kocaeli-Istanbul, Erzurum-Erzincan, Adana-Antakya and Izmir; the places which have fertile alluvial soils and are densely populated.

For this study, the earthquake records that have been recorded by Kandilli Observatory and Earthquake Research Institute of Boğaziçi University since 1868 are one of the most important source of information which accounts for the earthquake risks in İzmir and Turkey. Another important source used in this study is the information on the website of Turkish Prime Ministry Disaster and Emergency Management Presidency which enables the real-time monitoring of seismicity in Turkey in general and Izmir in particular. In addition to these sources of information, seismic studies have yielded very valuable results which have provided both clarity and reliability on the data obtained by other sources.

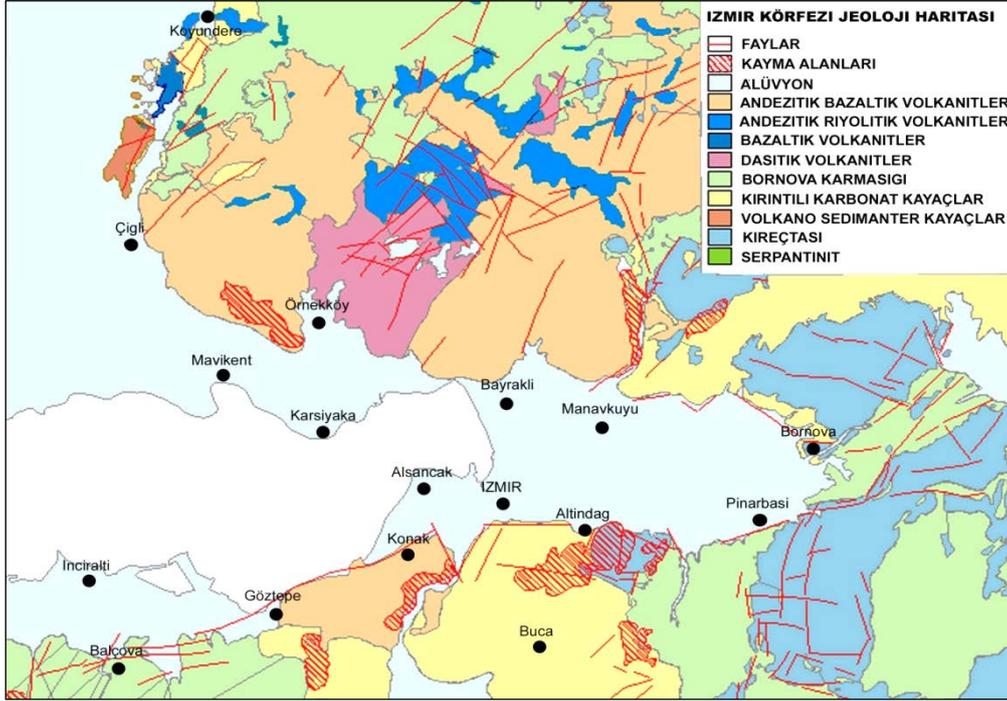
The first attempt to classify active faults in Turkey was the inventorial Active Fault Map of Turkey (scaled: 1: 2.000.000) prepared by the General Directorate of Mineral Research and Exploration (MRE) which used the data collected until 1987. Detailed maps which laid the foundations of this general map were published by Sengör et al (1985), Şaroğlu et al. (1987), Barka (1992) and Armijo et al (1992) (Figure.1).



**Figure 1.** All of Turkey's major seismic potential high active faults and fold belts (Barka and Reilinger, 1997)

The faults (Figure.2) which will cause earthquakes in Izmir and its immediate vicinity have been shown on the maps drawn by researchers, public institutions and private institutions that have been conducting research in the city for many years. However, what should be kept in mind is the fact that no matter what kind of method is

applied, neither the exact location of the faults nor their earthquake-generating potentials can be precisely known. At this stage, it is especially important for scientists to regard the data-based predictions as accurate as possible.



**Figure 2.** Geological map of Izmir and its immediate vicinity (MRE, 2005, compiled and modified from Tan et al, 2012.)

Constituting the second part of the study, the data on the conditions of the Buildings were compiled from the archives of the Chamber of Civil Engineers, and from the personal information and years of experience of the civil engineers who made presentations in the awareness-raising activities as specialists in their field. Thanks to this data, which is the most striking part of the study, many facts on the existing conditions of the buildings in Izmir have been brought to light (Figure 3) and the relevant institutions have been informed about the situation.



**Figure 3.** A 5-storey building without a foundation in Şemikler, İzmir (left), an illegal apartment built with the removal of the roof in Çınarlı (right) (Photos; Anonymous, 2009)

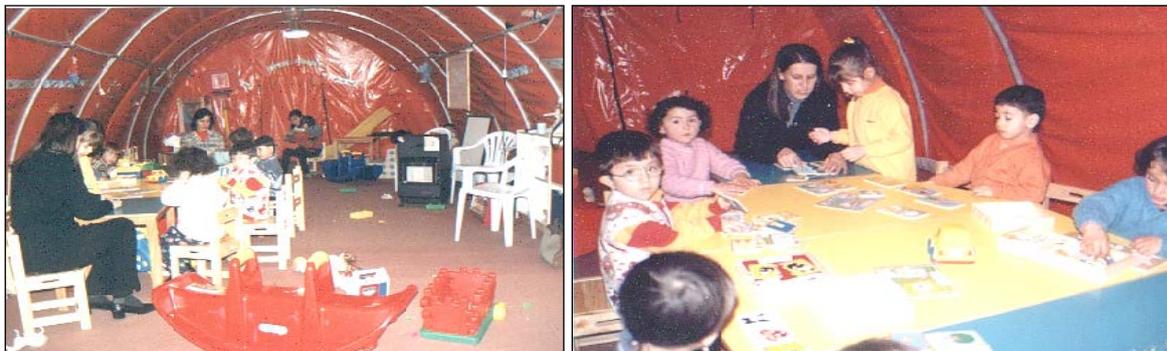
A written, visual and applied data set prepared by the Directorate of Izmir Provincial Civil Defense was used in the third part of the presentations within the context of “What Should We Do before, during and after an Earthquake?” Being very critical and aiming to prepare people for possible earthquakes, this part of the study

started with some video footage from the earthquake that occurred on August 17, 1999 and then lectures were given to inform people on what to do to avoid the recurrence of such situations in the future. The data set prepared and presented by Civil Defense experts contained information with visual materials from various quarters such as a family earthquake plan, reduction of non-structural hazards, earthquake safety at school (Figure 4), safe driving during an earthquake and even what to do if trapped under debris during or after an earthquake.



**Figure 4.** What should we do if we are at school during an earthquake? (Never go under the wooden desks!)

In the light of what has been explained so far, the last part of the study tackled the question “What will survivors need?” after an earthquake. The data used for this purpose were collected by experienced psychiatrists and psychological counselors who carried out conversation and sharing sessions with people for post-earthquake normalization of life. This part, which is especially very important for the success of this study, is also a sine qua non for the well-being of people who go through tragic events such as an earthquake because human beings tend to live in their emotions and some of the people will try to restore their lives after experiencing an earthquake disaster. People who will have lost their loved ones and possessions in an earthquake, in short, those who will have concerns about the future will need psychosocial support to be able to continue their normal lives again. Psychological first-aid services may not be sufficient at this point. However, proven-effective psychosocial support models which can be applied to people affected by earthquakes and many other similar disasters have just begun to be prepared in Turkey (Figure 5).



**Figure 5.** Continuing education in a kindergarten tent established after August 17, 1999 earthquake in Golcuk. (Some of the children in the photo have lost their parents in the earthquake. We remember them with sorrow...)

### Findings of the Study and an Applicable Model

Having been addressed in a section of the first part of the study, the earthquake reality in Turkey was reemphasized using both historical and recent data. However, there is no denying the fact that it does not seem possible in the near future to predict the location, size and time of an "earthquake" at a reliable level. For this reason, the recent data on earthquakes which occurred and are expected to occur on the known fault lines enable us to make a prediction. The historical and instrumental earthquake records indicate that there have been many earthquakes in Izmir and its immediate vicinity in the past two thousand years. The presence of many active faults in the immediate vicinity makes it difficult to establish a direct relationship between earthquakes and faults (MRE, 2005, Report No: 10754). In order for this relationship to be meaningful and for earthquakes to be predicted, auxiliary data from other disciplines should be processed and included in the interpretation. One of the

auxiliary data is the soil conditions of an earthquake area. Despite lacking suitable soil conditions for high-rise buildings, the majority of Izmir consists of areas with high settlement density and extremely young and loose alluvial soils (Figure 2). A soil, regardless of the magnitude of an earthquake, makes its movement in the range of its own characteristics and can cause the structures on it to remain intact or to collapse.

The second part of the study revealed the situation of the buildings built on these soils. The scenario which is valid in all of Turkey is the same for Izmir as well. The situation of the buildings in Izmir and its immediate vicinity becomes evident with the data on soil investigation reports and proper location of water and electrical installations in an apartment shared by the specialist engineers, who also shared their knowledge with everyone openly on what we should pay attention to when buying an apartment and especially what our legal rights are.

The findings of the third part of the study demonstrated especially the extraordinary experiences of the search and rescue teams in the earthquakes that occurred in our country and also presented similar examples from different countries and the approaches they adopt and the actions they take in the face of earthquakes. The wide range of information regarding pre- and post-earthquake precautions shared and discussed at this stage included reduction of non-structural hazards and a family earthquake plan before an earthquake, the first aid to be applied to the wounded after an earthquake in Izmir, prevention of possible fire hazards and even the establishment of "Community Disaster Volunteers (CDV)" teams consisting of volunteers by raising the level of consciousness.

The final stage is perhaps the longest and the most comprehensive stage in terms of the scope of the data available since, at this stage, earthquake survivors need first spiritual and then financial support in order to continue their lives. It is especially very difficult to rehabilitate people who lose their mental health after an earthquake and it takes a very long time for people who lose their loved ones in an earthquake to recover. In fact, some people suffer from a loss of joy or a loss of interest in life and some prefer to end their lives as a result of psychological problems. This is one of the saddest truths of our country and unfortunately the majority of the society has been insensitive to it. Extreme feelings we had about and right/wrong reactions we showed towards not only the earthquakes but also the mine accidents in recent years have led to an inevitable situation. Specialist psychiatrists and social support workers exert themselves to the utmost just like they did in the Soma mine accident which took place on May 13, 2014. However, all this effort may be inadequate. For this reason, it is of vital importance to interpret the findings correctly and choose the most suitable model.

Suggested by Berkowitz (2010) and based on the transfer of a series of post-disaster coping skills which psychological counselors can apply in the long term after an earthquake, the "Skills for Psychological Recovery" model was brought up for discussion in the study. This model is an evidence-based modal approach which can be used in situations where psychological first-aid support is not sufficient in the period following traumatic events experienced by children, adolescents and adults. This model is not a mental health treatment but rather a secondary prevention model. In other words, it was designed to reduce stress, describe existing intervention skills and improve operability.

The main goals of this model can be listed as follows;

- \* Quick recuperation and recovery
- \* Preventing mental problems
- \* Supporting work
- \* Preventing behavioral disorders

In order to achieve these goals, it is imperative that all actors (authorized bodies of the state, engineers, doctors, workers, homeowners, tenants and even foreign experts if needed) fulfill their tasks duly. A defect in one of these integral parts will, otherwise, affect the whole "BUILDING."

## **Results and Discussion**

Due to the bitter experiences caused by the earthquakes throughout history, people have to accept natural disasters as a normal part of life and learn to live with them. Due to its geological structure and location, there have been and will be many devastating earthquakes in Turkey, which is on one of the most important seismic

belts in the world. Material and moral damage incurred by an earthquake can be minimized by effectively implementing planned and rational tasks (Radius project, [www.izmir.bel.tr/izmirdeprem/chp1.html](http://www.izmir.bel.tr/izmirdeprem/chp1.html)). Since we will always encounter natural and man-made disasters, these and similar models should be examined and adaptations should be made considering the existing conditions. This model should be examined in more detail by relevant experts together with the contributions of other disciplines and put into practice.

The model suggested by this study is actually only to help solve the problem. Earthquake scenarios can be described by a number of models, however, it takes a lot of time and effort to describe and implement a psychosocial model that will be set after an earthquake. This model, which is to be implemented to bind up the wounds of the suffering especially after major disasters such as an earthquake, should be adapted and improved further considering all living conditions in our country.

In conclusion, it should be kept in mind that the principle of "Human life comes first." should penetrate all levels of the society and all aspects of social life, and as Mustafa Kemal Atatürk stated "it is of vital importance to think about measures to prevent and be protected from a catastrophe before it actually happens."

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