

Sakhalin Island.

Both conservative and surgical techniques were used in treatment of children with compression injuries. The most appropriate methods used included skeletal extraction, intrafocci, and closed intramedullary osteosynthesis.

According to our experience, multi-organ functional failure as a manifestation of crush syndrome complicated treatment in 21.6% of the children. In the most difficult cases, the method of extracorporeal blood purification was used in 10.1% of children with the crush syndrome. The mortality in this group was 10.7%.

**Conclusion:** Compression trauma in children is characterized by high incidence of disabilities and high mortality.

**Keywords:** children; compression injuries; crush syndrome; earthquake; fractures; multi-organ failure; orthopedics; purification, blood; techniques, surgical; treatment

#### PL1-4

##### Children in Disaster

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Children in disaster present emergency workers with specific problems. The youngsters are not "mini adults", and cannot be treated as such. Yet, equipment prepared for use at major incidents rarely includes more than a token item or two designed specifically for use with a child. Most medical response teams would be able to deal with a handful of young victims, but very few could manage large numbers of child casualties.

This paper will discuss the history of disaster in Britain to illustrate how often large numbers of young victims can be expected. At Rotherham, in 1841, 64 children were drowned as they celebrated the launching of a ship. A few years later, at Yarmouth in 1845, 79 people, mostly children, died when the newly opened bridge they were standing on collapsed. At a Sunderland theatre in 1883, 183 children were killed in a crush as they rushed to the building's single exit after a magic show. And when a TNT plant exploded in East London in 1917, at least one-third of the 73 fatalities and 1,000 injured were children. In more recent years, we have witnessed the horror of Aberfan, where a slagheap swept down a mountainside, engulfing a school and killing 116 children and 28 adults. Few will have forgotten the horror of Dunblaine, where 17 infant school children and their teacher were shot dead in the school's gymnasium.

This paper will highlight how responders to disaster must expect that a significant proportion of victims will be children, and will examine the special needs of paediatric patients. It will argue for the provision of emergency paediatric packs to be maintained and available at strategic locations. It also will call for the availability of mobile paediatric medical teams. These specialist teams would assist at incidents involving groups of children, particularly those with physical handicaps or learning difficulties, but with minimal injuries, where transport

to an Accident Department would be inappropriate.

**Keywords:** children; disasters; equipment; history; paediatrics; supplies, cache of; teams, mobile

#### PL1-6

##### Earthquake in Armenia — 10 years Afterward

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As the result of the devastating earthquake in Armenia in December 1988, there were more than 3,000 injured children, which comprised 27.2% of all victims. Most of the injured children received their primary help and treatment in different hospitals of Armenia and the former Soviet Union. Later, the most severely injured children underwent orthopedic and rehabilitation treatment, as well as fitting with prostheses in different hospitals of the USA, Germany, France, Israel, and Canada. Long-term follow-up and treatment were needed for patients with limb amputations (57 kids), spinal cord injuries (7 patients), and children with severe limb paralyses after crush-injury (>150 patients).

During past 10 years, all of the injured children recovered psychologically and physically as much as possible. With the help of different international organizations (International Federation of Red Cross and Red Crescent Societies, German and Bavarian Red Cross, MSF, etc.) and the Governments of different countries, many general and children's hospitals, rehabilitation centers, and prosthetic-orthotic workshops were built and equipped in earthquake area. At the same time, many newly founded, local non-governmental organizations (NGOs) continue psychological and social rehabilitation of earthquake victims and children with different types of disabilities.

**Keywords:** Armenia; earthquake, Armenia; children; non-governmental organizations (NGOs); orthotics; orthopedic; primary treatment; prosthetics; rehabilitation; support

#### PL1-7

##### Rehabilitation of Disabled Children Who Suffered During Earthquakes

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Experience from consistent medical care administered to children who suffered severe compression injuries during the earthquakes in Armenia in 1988, Georgia in 1990, and on the island of Sakhalin in 1995, provides evidence of residual pathological changes. Approximately 24% of the hospitalized patients experienced compression trauma during the earthquakes, and injuries of the extremities prevailed in 90% of the cases. There were 2,645 children

hospitalized after the earthquake in Armenia, and only 56 of them (2.1 %) had amputations. During the Sakhalin earthquake, the number of amputations was 12 out of 112 admitted patients (9%). Each of these children needed correction and changes in their prosthetics 1-3 times during the year following the provision of the first prosthetics. Later, the prosthesis exchange was done within 6-12 months during the child's growth period.

Disabled children had medical and social rehabilitation in hospitals and camps for recovery treatment, as well as education and proper professional orientation. Rehabilitation became more difficult when a child had lost his parents, or s/he had to change residence and his/her usual environment was disturbed. The optimal rehabilitation of the patients who suffered during disasters requires advanced planning for the long-term and expensive state programs that aim at the social rehabilitation of invalids.

**Keywords:** amputations; children; disability; fractures; injuries, compression; prosthetics; rehabilitation; trauma

#### PL-1-8

##### Rehabilitation of Children with Crush Syndrome

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We observed 17 children, age 2 to 13 years injured at the time of the earthquake. All children had crush syndrome of extremities of various degree of weight. Five children had fractures of extremities, and nine children had acute renal failure with the duration of anuria from 3 to 22 days. All of the wounded had traumatic or hypovolemic shock. During the period of intensive therapy of the children, 77 operations including seven amputations of lower extremities in six of the children, 33 procedures of hemodialysis, 20 episodes of plasmapheresis, three hemofiltrations, and 60 hyperbaric oxygen treatments were executed. A total of 143 litres of fluids and preparations of blood were administered.

The stages of the children's rehabilitation can be divided into three parts: 1) functional (including mobility); 2) psychological; and 3) social adaptation. The elements of the medical physical culture began from the first days of their stay in the intensive care department. It was included respiratory exercises, massage of intact parts of the body with the subsequent expansion of the intensity and duration of the procedures. The complex of physiotherapeutic procedures included variants of microwave therapy, ionophoresis of medicine preparations, lazer therapy, and others. To a smaller degree water procedures were used. In connection with the development of neuropathy of the lower extremities of 11 of the children, special recover therapy was conducted by common orthopedic and neuropathological specialists. Of the four children with amputated extremities, the functional recovery depended on qualitative forma-

tion of individual prostheses. This work was executed for three months in Japan under the invitation of its government. At end of the treatment, each of the four invalids could move independently.

Very important for the successful treatment of these children was the provision of psychological support without exceptions for all of the children. The younger children developed psychological damage easier; it was manifested in the first weeks by psychoasthenia, and was activated in parallel with recovery of the children, expansion their mobility and other functional capabilities. The older children had suffered the sudden loss their homes, relatives, and customary image of life. Some developed advanced reactive conditions with a prevalence of depressive syndromes. The help of psychiatrists appeared the most valuable in acute period of treatment. The most important positive psychological factor was the appearance of relatives (live parents were found only for four of the 17 children) whose presence had a stabilizing effect on the children's psyche.

The most complex problems were the social problems. Only with help the directed policy of the State, the chapter of Khabarovsk region's administration managed overcome the difficulties. All of the children found homes and developed a sense of life and reliance for the future.

**Keywords:** amputations; children; crush syndrome; depression; loss; psychosocial reactions; rehabilitation; social condition

**General Session-V**  
**Complex Disasters**  
**Monday, 10 May, 16:00-17:30 hours**  
**Chair: Eric Noji, Maseteru Shindo**

#### G-20

##### Advance Deployment and Organization of Activity of a Field Multiprofile Hospital (FMH) in Local Armed Conflicts

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In health responses to military operations, Field Multiprofile Hospitals (FMH) have a particularly specific role. This paper presents studies of the types of casualties, the characteristic properties of the affected people cohort, and the capacity for evacuation.

Medical care delivery to the affected in armed conflicts is not a general practice for civilian medical units, including the Field Multiprofile Hospital (FMH) of ARCDM "Zaschita". The FMH had a unique experience with such military activity during the conflict in the Chechen Republic from 1994-1995. In those years, the FMH teams worked in localities such as Mozdok, Tolstoi-Yurt, Znamensky, and Grozny. The teams participated in health response activities following acts of terrorism in Budenovsk, on the Chechen-Daghestan border (Pervomajsky), and during the military operations within the area of the Sunzhi station (1996).