

Kalos Rehabilitation Hospital in Vela Luka, Croatia

Patients with severe disability and dependency who cannot be treated in other settings receive inpatient rehabilitation. Such rehabilitation is usually provided after an acute disease (eg, stroke or polyneuropathy), trauma (eg, compound fractures, craniocerebral or spinal injuries), surgical treatment (eg, intracranial meningioma surgery, hip or knee replacement, or amputation of lower limbs), deterioration in the course of a chronic disease (eg, arthritis), or in case of congenital malformations and birth-related injury. Facilities providing this type of care are usually established in large cities to allow for the easier recruitment of rehabilitation professionals and enable the family to participate in the care of the sick member and become a part of the rehabilitation team. Except for the facilities originally intended for other purposes, such as a rehabilitation facility in the Czech Republic located in a remote forest region and built for the treatment of tuberculosis, they are rarely located away from the cities (1).

Kalos rehabilitation hospital in Vela Luka on the island of Korčula in Croatia is also one of such facilities. Established in 1972, it marked its 35th anniversary last year.

Korčula, with an area of 279 km² (46.8 km long and 7.8 km wide) is the sixth largest of the 67 inhabited Croatian islands and, with nearly 20 000 inhabitants, the most populous one. It is covered with Mediterranean flora and black

pine forests, which were the reason why the ancient Greeks named the island *Korkyra Melaina* or Black Corfu. The main sources of income on the island are tourism, wine and olive cultivation, fishing, and shipbuilding. There is a main road running along the spine of the island, connecting all the settlements. The island has several villages and two towns – Korčula (3232 inhabitants), an ancient fortified town on the protected east coast of the island, and Vela Luka (4380 inhabitants) on the west coast. Both towns are connected with the mainland by ferries and fast catamarans.

Vela Luka is located at the tip of a long, wide bay with many coves. One of these coves, called Kale (hence the name Kalos), contains large amounts of mineral peloid mud, which has for a long time been used for the alleviation of musculoskeletal symptoms. In 1955, a wooden barrack was built at the site and the experimental exploitation of the heated mud and the adjacent source of radioactive mineral water containing radon began. In 1972, at the site of the wooden barrack, a spa resort was constructed with a ward for diagnostic procedures and physical therapy; it was the beginning of the Kalos institution (2). In 1977, a facility for inpatients was added, at first as a part of a hotel enterprise and, since 1978, as an autonomous health institution (3). In a reform of the health care system in 1993, Kalos received the status of a “special hos-

Table 1. Departments for adult and children inpatients in Kalos hospital

Department	No. of beds	Bed occupancy rate (%)	No. of discharged patients annually	Average length of stay (days)
Adults:				
after orthopedic and surgical interventions and trauma*	43	95.75	690	21.78
neurological rehabilitation	40	85.32	580	21.48
musculoskeletal conditions	24	37.85	150	21.64
Children	20	65-70†	–	17.61

*Average age of patients is 64.6 years; average Barthel Index on admission 71, on discharge 91.

†Mothers of children younger than 3 years are admitted together with their children and occupy some of the beds.

pital for medical rehabilitation,” together with 9 former spas in Croatia (4).

Today, Kalos has 250 beds. About a half of its capacity is used by the beneficiaries of the Croatian Institute for Health Insurance (CIHI), while the rest is offered to self-paying customers – mostly patients from the neighboring Bosnia and Herzegovina, organized groups of retired people, or health tourists. There are 3 departments for adult patients with 107 beds and a department for children with 20 beds. The department for rehabilitation after orthopedic and surgical interventions or trauma mostly includes patients who have undergone hip replacement (45%), knee replacement (10%), osteosynthesis of the femur (18%), and amputation of the lower limbs (5%). The department for neurological rehabilitation admits patients who have had a stroke (42%) craniocerebral injury (9%) or spinal cord injury with tetraparesis or paraparesis (8%), and the department for musculoskeletal conditions mostly provides care to patients with rheumatoid arthritis and osteoarthritis. As majority of patients in this department may be treated as outpatients, free beds are reserved for patients with other conditions, which explains the low bed occupancy rate (Table 1). In 2006, 365 children (aged 18 months to 18 years) were treated. Most of them (41%) were aged 3-7 years; 123 (34%) were with cerebral palsy, 82 (23%) with cerebral palsy-related movement limitations, and 73 (20%) with deformations of the vertebral column. Of these 365 children, 213 (nearly 60%) were treated as inpatients.

The hospital annually provides rehabilitation to nearly 3500 CIHI beneficiaries, 1400 (44%) of which are nearly immobile and in high degree of dependency. The institution caters for a population of more than 800 000, mostly from the Split-Dalmatia (58%) and Dubrovnik-Neretva Counties (32%). Waiting time for admission is on average one month. Besides Kalos, there are two other rehabilitation facilities in the region, a rehabilitation department at the Split University Hospital (45 rehabilitation and 25 rheumatology beds) and Biokovka hospital for medical rehabilitation in Makarska with 93 rehabilitation beds (not admitting immobile patients or children). Patients are transported from the Split University Hospital and the Dubrovnik General Hospital to Vela Luka by ambulance and the ferry, which in both cases lasts for about 3 hours. Kalos provided consultation and physical therapy to more than 2500 ambulatory patients in 2006, with over 88% of them from the Dubrovačko-Neretvanska County.

Kalos employs 160 workers (Table 2), 73 (45%) of whom are health professionals, all residing in Vela Luka or other settlements on the island. There are modern premises for oc-

Table 2. Rehabilitation professionals employed in Kalos hospital

Professionals	No. of employees
Physicians, specialists in physical and rehabilitation medicine	6
Physiotherapists	38
Nurses	21
Occupational therapists	2
Speech therapist	1
Psychologist	1
Massagists	4

cupational therapy of adults and children, a large hall for kinesiotherapy, facilities for physical therapy, treatment with mud and paraffin, and several pools for various forms of hydrotherapy.

As the hospital has been affiliated with the Split Medical School since 2004, it also provides clinical teaching in Physical and Rehabilitation Medicine (3 days of a 10-day obligatory course) for the 5th-year medical students (5).

Several aspects of the hospital's functioning need improvement. The waiting time for admission is too long; the Functional Independence Measure should be used instead of the Barthel Index (6); and outcome measures related to long-term health and well-being should be taken into account in addition to basic activities of daily living (7).

There are no other health institutions on the island, except for two primary health care centers providing some secondary care services, such as diagnostic radiology, medical laboratories, and a hemodialysis unit.

During the 1991-1995 war in Croatia, Kalos provided rehabilitation to military and civilian war-related casualties, transferred from hospitals in Split and Dubrovnik after the completion of their surgical treatment. It treated 2144 injured, 501 from southern Croatia (1991 to 1994) and 1643 from the neighboring Bosnia and Herzegovina (1992 to 1995), with an average length of stay of 48.55 days (Table 3 and Table 4). Many of the rehabilitated became ambulatory and able to self-

Table 3. Location of injuries in war-related casualties treated at Kalos hospital*

Injury site	No. (%) of injured
Bone – muscular system of pelvis and lower limbs	842 (52.9)
Bone – muscular system of shoulder and upper limbs	385 (24.2)
Peripheral nerves	310 (19.5)
Thorax and abdomen	173 (10.9)
Multiple injuries (multiple trauma)	149 (9.4)
Cranio-cerebral injuries	147 (9.2)
Vertebral column injuries	83 (5.2)
Injuries to large veins and arteries of limbs	75 (4.7)

*Most injuries were explosive (34.5%) and firearm injuries (33.4%).

Table 4. Rehabilitation outcome of war-related casualties treated at Kalos hospital*

Barthel index	Injured (%)	
	admission	discharge
Below 60*	26.6	3.5
Above 60†	73.6	96.6

*Total dependency in ambulation and self-care (6).

†Partial or total independence in ambulation and self-care.

care (8). During the siege of Dubrovnik by the Yugoslav Navy in 1991 and 1992, an improvised military hospital with an operating theater was established on the island (9), and Kalos provided general medical and post-surgical care to island inhabitants and refugees from Dubrovnik and Ston areas.

Although it is an accepted practice to establish city-centered facilities for inpatient rehabilitation, Kalos hospital has demonstrated that, in spite of disadvantages due to remoteness (35 nautical miles from the nearest land and 200 km from the nearest hospital), dedicated, motivated, and well-organized rehabilitation professionals can make their facility function effectively, contribute to the education of medical students, and fulfill vital tasks in emergency situations.

Sandra Pecotić-Jeričević
Tonko Vlák
Asija Rota-Čepnija
Mada Visković
Nadija Franulović-Golja
Reuben Eldar
eldrub@014.net.il

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