

RECOVERY FROM AN EIGHTY-PERCENT TOTAL BODY SURFACE AREA BURN INJURY SUSTAINED AT WORK*

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This article presents a case of severe burn injury at work involving 80 % of body surface area and patient treatment and rehabilitation, which resulted in preserved working ability. The worker was injured by hot water and steam. After initial treatment in the intensive care unit, he underwent comprehensive clinical and outpatient rehabilitation that took 92 weeks, after which he returned to work. His working disability was 100 % after the initial treatment in the intensive care unit, but rehabilitation improved it to 50 %. It should always be kept in mind that even patients with serious or life-threatening injuries can be reintegrated into the workforce if patients, physicians, occupational physicians, and employers all work together.

KEY WORDS: *occupational physician, rehabilitation, working ability*

The outcome of a severe burn trauma depends on the age of the patient and the percentage of the affected total body surface area (TBSA) (1). In developed countries, modern therapy and rehabilitation have significantly cut down burn mortality over the last four decades, making survival possible even after 100 % TBSA burn (2, 3). However, the working ability of patients who survived severe burns is rarely discussed, and the aim of this case report is to address this topic.

Case report

On 6 November 2000, two workers were involved in an accident with hot water steam at a large power plant. The worker described in this report was a 40

year old plumber servicing long-distance hot water pipes. The accident happened during replacement of a special hot water pump for long distance heating. The workers were injured by hot water and hot steam. Fifty-six litres of 130 °C hot water expanded into approximately 1500 m³ of steam. Two colleagues took the injured workers out of the accident area. Narrow space, no cold water supply in the vicinity, and grid staircases hampered swift first aid. It took about 20 minutes for the colleagues to start cooling the patients down with cold water. Paramedics and a rescue doctor arrived to take the accident victims to the nearest hospital intensive burns unit. This case report focuses on the patient who suffered greater burn injury and was diagnosed with an 80 % TBSA burn. As complications ensued, he was later diagnosed with drug induced colorectal bleeding, colitis, and posttraumatic tinnitus. Treatment, including

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rehabilitation, took 92 weeks, 10 of whom in intensive care (see chronology in Table 1).

Initial hospital treatment

As approximately 80 % of the TBSA was destroyed by mostly superficial and deep second-degree burns, an escheratomy plus fasciectomy on both arms and legs was performed shortly after hospital admission. Over time, several tangential necrotomies and mesh grafts were also necessary. The rest of the burns were treated with dexpanthenol, a fat-based ointment twice a day in combination with a special pressure suit (with socks and gloves). The little finger on his left hand was treated with proximal interphalangeal (PIP) joint arthrodesis for three weeks. Because colitis lowered haemoglobin, he was also receiving two concentrates of red blood cells a day. The bleeding stopped after coloscopic injections and special oral medication. The second right toe was amputated on 12 January 2001, and on 21 January the patient also received a free flap deficiency cover for the middle joint of his left little finger.

He began psychotherapy while in the intensive care unit, a few days after extubation. It consisted of 25 90-minute sessions, three sessions a week.

Outpatient treatment and rehabilitation

When the patient was discharged from hospital on 23 January 2001, most body surface areas were epithelised. However, some areas still needed daily treatment with yellow paraffin, a mixture of cloxiquine, fluprednidene acetate and gentamicin sulphate, and Arachidis oleum. Additionally, a wide range of oral medication was necessary for several weeks (caroverine, paroxetine, flunitrazepam, omeprazole, enoxaparin sodium, vitamins A, B and E, magnesium, *Lactobacillus rhamnosus*). On the inside and outside of both thighs, areas with hypertrophic granulation tissue were cauterised with silver nitrate.

Upon discharge from the hospital the patient was assessed with a 100 % reduction in working ability. Table 2 shows his subjective symptoms recorded in February 2001. At the same time, the patient experienced mobility problems such as difficulties bending and stretching knees, ankles, elbows, and wrists, a 3 cm deficiency in stretching fingers 2 to 5 of the left hand, inability to make a fist with either hand, reduced mobility of both shoulders and hip joints, and a 50 % reduction in the mobility of the remaining nine toes. Clinical rehabilitation included bandage change, general fitness training and training with weights, single ergotherapy, single physiotherapy, lymph drainage, work therapy, breathing exercises, and weekly psychotherapy sessions lasting 90 minutes (Table 1). However, on discharge from the rehabilitation clinic, the patient still suffered from decubitus ulcers on both heels (2 cm x 1 cm and 1 cm x 1 cm).

All other special treatment and patient assessment was conducted by occupational health office in an outpatient clinic. From 15 January 2001 to 29 January 2002, the patient wore a special compression suit with socks and gloves 24 hours a day. From 23 January to 5 February 2001 he had breathing exercises and ergotherapy one hour a day. This was repeated from January to April 2002. He developed tinnitus in May 2001, which was treated with *Ginkgo biloba* leaves and his paraesthesia with piracetam for six weeks. He was continuously receiving caroverin, paroxetin and vitamin B. At the same time, he had 14 hourly sessions of physiotherapy, which was repeated. This was combined with special gymnastics for the big joints plus 20 massage sessions lasting one hour each in order to stretch the skin. The patient was subjected to 245 soft 250 mW laser treatments from May 2001 to December 2004, each session lasting three to four hours. Every 10 cm² of skin was treated for 15 minutes to relieve itching and contractions. One-hour special skin treatment with collagen patches under a plaster occlusive dressing was administered 14 times,

Table 1 Chronology of treatment and rehabilitation

6 November 2000: Accident, first aid by colleagues, transport to general hospital intensive care unit.
23 January 2001: Discharge from hospital and the beginning of outpatient treatment for two weeks.
6 February 2001: Beginning of treatment in a rehabilitation clinic for 11 weeks.
24 April 2001: Discharge from rehabilitation clinic.
25 April 2001: Beginning of further outpatient treatment for another 57 weeks.
1 June 2002: Patient returns to work.

Table 2 *Patient's symptoms on arrival to the rehabilitation clinic on 2 February 2001*

Itching
Reduced flexibility of all fingers
Reduced muscular strength
General oedema and oedema of both ankles
Inability to lift either foot
Limping and slow gait
Inability to walk or stand on toes and heels
Inability to squat and kneel
Various scars on all limbs after several operations
Various more or less secreting wounds
Decubitus ulcers on both heels (4 cm x 2 cm, and 2 cm x 2 cm)
Hyper- and depigmentation
Circular scars reaching from the abdomen to the back
Defective hearing and tinnitus
Reduced sensibility of both arms
Reduced sensibility of both legs from the knee down

followed by 74 treatments with hyaluronic acid lotion applied by massage and treatments with epidermal growth factor activator. On 4 December 2001, a plastic surgeon declared that plastic surgery was not necessary at that point unless joint dysfunction should develop. Until the writing of this article no operation was necessary.

In April 2002, the patient was assessed a 50 % reduction of working ability and returned to work on 1 June 2002. In the beginning, he mostly did office work and was also allowed to take breaks or stop working whenever he felt necessary. In 2003, he gradually started doing manual work such as installation of measuring devices and even began to install three to six meters long pipes. Because of his experience, he no longer works shifts and cannot work in small rooms, on scaffoldings, beneath grids, or in areas where he is unable to leave immediately.

My conclusion is that cooperation between patient's employers and occupational physicians is

vital and should receive due attention. In addition, every plant should have an adequate number of first aid assistants. We should always keep in mind that even patients with serious or life-threatening injuries can be reintegrated in the workforce if patients, physicians, occupational physicians, and employers all work together.

REFERENCES

1. Osler T, Glance LG, Hosmer DW. Simplified estimates of the probability of death after burn injuries: extending and updating the Baux score. *J Trauma* 2010;68:690-7.
2. Lionelli GT, Pictus EJ, Beckum OK, DeCoursey RL, Korentager RA. A three decade analysis of factors affecting burn mortality in the elderly. *Burns* 2005;31:958-63.
3. Wang FS, Nie LJ. Successful treatment of a patient with 100 % total burn surface area at high altitude. *Burns* 1999;25:519-21.

Sažetak**OPORAVAK OD OPEKLINE NA RADU KOJA JE ZAHVATILA OSAMDESET POSTO UKUPNE POVRŠINE TIJELA**

Ovaj članak prikazuje slučaj teške ozljede na radu uslijed opeklina koja je zahvatila 80 % površine tijela bolesnika, njegovo liječenje i rehabilitaciju, kojima se uspio očuvati dio radne sposobnosti. Opeklinu je izazvala vrela voda i para. Nakon početnoga liječenja u jedinici intenzivne skrbi, bolesnik je bio na kliničkoj i ambulantnoj rehabilitaciji od 92 tjedna, nakon koje se vratio na posao. Nakon početnoga liječenja bolesnik je bio potpuno nesposoban za rad, da bi se nakon rehabilitacije radna sposobnost vratila na 50 %. Uvijek valja imati na umu da se čak i bolesnici s teškim i po život opasnim ozljedama mogu vratiti u radnu zajednicu ako surađuju zajedno s liječnicima, specijalistima medicine rada i poslodavcima.

KLJUČNE RIJEČI: *specijalist medicine rada, rehabilitacija, radna sposobnost*

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