Staff Sgt. Mike Calaway, the NCO in charge of outpatient burn rehabilitation, gently stretches the scarred skin on Pfc. Antoine Reeves' hands to reduce stiffness and increase his range of motion. Reeves gave the following advice to future patients: "Push yourself and listen to the nurses, because at the end, it's worth it. During treatment, it's painful ¬– you might not even feel like getting up. But in the end, it's all worth it. I know I didn't want to get up at all. When I first came, I didn't know I couldn't walk. It just felt weird that first time when I tried to get up and couldn't. It was crazy. It's a long road. … It feels like forever, but it's worth it." (Photo by Meghan Portillo)

NCOs Boost Patient Care at Military's Only Burn Center

By Meghan Portillo

NCO Journal

The U.S. Army Institute of Surgical Research Burn Center at Fort Sam Houston, Texas, is the military's only burn facility, as well as that for the civilian population in the San Antonio area. For the burn victims who become patients for life – coming back years later for follow-up treatments or surgeries — NCOs are a vital part of the team that provides individualized care for each of them.

NCOs who are licensed vocational nurses, nutritionists, interns, and physical, occupational and respiratory therapists work together to help each patient reach their highest level of functioning, often returning Soldiers to the jobs they were trained to do.Depending on the severity of a burn and the overall health of a patient, some burn victims may remain in the hospital for more than a year. Others may only require a few days. As a general rule of thumb for those with partial- to full-thickness burns, a day of hospitalization will be required for every 1 percent of the body that is burned, said Steven Galvan, the public affairs officer for the U.S. Army Institute of Surgical Research.When a patient first arrives, he or she is evaluated by a therapist and often starts therapy from

Staff Sgt. Mike Calaway, the NCO in charge of outpatient burn rehabilitation, gently stretches the scarred skin on Pfc. Antoine Reeves' hands to reduce stiffness and increase his range of motion. Reeves gave the following advice to future patients: "Push yourself and listen to the nurses, because at the end, it's worth it. During treatment, it's painful ¬– you might not even feel like getting up. But in the end, it's all worth it. I know I didn't want to get up at all. When I first came, I didn't know I couldn't walk. It just felt weird that first time when I tried to get up and couldn't. It was crazy. It's a long road. … It feels like forever, but it's worth it." (Photo by Meghan Portillo)

day one. Therapists work closely with patients seven days a week until they are able to function on their own and transition to outpatient status.

Staff Sgt. Mike Calaway, the NCO in charge of Outpatient Burn Rehabilitation, said one of the keys to patients' progress is a seamless transition from their life as an inpatient to the routine of living at home and making frequent visits to the center for therapy.

"They do so much on the inpatient side, and we know exactly where they are in their recovery when they come to us. So we don't let them skip a beat," Calaway said. "I've seen some amazing progress. We have a patient right now who is recovering from nerve damage; his nerves are waking back up. His progress is amazing. This is really aggressive therapy. Just keeping on top of it as they move from the inpatient side to the outpatient side, that's the big thing."

Calaway noted the quality and professionalism of the burn center's highly trained staff. The burn center is the third Army medical center in which Calaway has worked, and he said the work environment is truly unique, with therapists in different specialties working closely as a team to treat each patient.In many hospitals, the two departments complement each other but operate separately. Physical therapists usually focus on helping patients regain mobility, while occupational therapists work with patients to perform basic tasks independently. But at the burn center, Calaway said, occupational and physical therapists work hand-in-hand to provide co-treatment every single day. One knows the other's job, and physical therapy technicians will often work directly under an occupational therapist, or vice versa."There is a lot of care and training that goes into the team that I work with here," Calaway said. "For me, that's what sets us apart from any other medical facility: the professionalism and the care provided by the techs all the way up to the doctors.

"You don't see that at other places — nurses, physical therapists, occupational therapists, surgeons, nutritionists — every single part of the team working together every single day. They know each other very well, each knows the patient very well, and everybody contributes to the treatment and care of each patient."

Sgt. 1st Class Hugo Roman, the NCOIC for burn

Jennifer Tucker, an occupational therapist, adds a component to a patient's splint to gradually stretch the tendons in his hand. "His wrist, hand and thumb movement is coming back," Tucker said. "But because of the lack of movement for so long, a lot of his tendons are really tight. So now we are trying to stretch the tendons that extend the fingers." (Photo by Meghan Portillo)

occupational therapy, and Sgt. 1st Class Russell Gilmore, the NCOIC for burn physical therapy, said their departments and others within the burn unit work as closely as possible to provide patients with the best care.

"We have all the parts working together here to provide the most complete care," Gilmore said. "We have our own operating room, our own respiratory therapists, our own doctors and nurses — everything specifically for the burn patients. Dieticians, operating room staff, nursing staff, research, you name it."

Flight team

In addition to the team of health care providers at the hospital, the burn center has a flight team prepared to fly at a moment's notice to Afghanistan, Singapore, Germany or anywhere else in the world where there is a burned or critically injured Soldier and transport him or her to the burn center in San Antonio.

The five-member team, usually composed of a burn surgeon, nurses, a therapist and a supporting NCO, leaves San Antonio on a commercial flight. The team then coordinates with units caring for the patient at their destination, often synchronizing efforts with Marine Corps, Air Force and Navy personnel to provide a seamless transition onto the aircraft that transports them back to San Antonio. The flight team provides constant care in-flight, and lands on a helipad on the roof of the burn center, where a team meets them to bring the patient directly into the intensive care unit or the operating room. Though it typically takes from 3 to 4 days from the time of injury to a patient's arrival at the burn center, the team recently completed a mission within 39 hours, Galvan said. No matter how long the trip takes, however, the team travels with all of the equipment it would use in the intensive care unit, allowing the team to provide nonstop care. "There are so many roles of an NCO on the flight team, and all are vital to mission success," said Staff Sgt. Seth Holland, NCOIC of the burn flight team.

As NCOIC, Holland counsels team members on the expectations placed on them. He conducts training, enforces standards, and maintains logistics and equipment, in addition to stepping in as the operations NCO as needed.

"Various specialties work together to care for these patients as we bring them back from theater to the ISR burn center for care. NCOs are a crucial part of that," said Dr. David Baer, director of research at the burn center. "They do the classic NCO job of being the operations NCO — making sure all the equipment is ready to go and maintained, and all the supplies are ready to go — because those teams, when the phone rings, they have about six hours before they need to be wheels-up on a plane heading out to meet the patient. So being ready to go and having the training ready to go is a key part of what the NCOs do. But NCOs are also crucial health care providers on the flight team."

As members of the flight team, NCOs work as licensed vocational nurses, in charge of continuous

From left, Capt. Michael Campbell, Lt. Col. (P) Booker T. King, Sgt. Nikenson Penette and Staff Sgt. Daniel J. Nelson monitor a patient during a flight from Singapore to San Antonio. (Photo by Staff Sgt. Seth B. Holland)

evaluation and monitoring of the patient before, during, and after the flight and transportation. The LVN is also responsible for wound care, maintaining the patient's blood pressure, and pre-combat checks and inspections of all flight equipment. Another key position on the team filled by an NCO is that of the respiratory therapist, the team member in charge of evaluating the patient's airways, ventilation and oxygen levels throughout changes in altitude, all while in flight and prepped in a foreign country with limited resources.

Sgt. 1st Class Hugo Roman, the NCOIC for burn occupational therapy, discusses the slings and nets developed by the research team to keep extremities in certain positions as they heal. Copper tubing is used as a frame to hold the netting in place. (Photo by Meghan Portillo)

Cutting-edge therapy and technology

The burn center utilizes the latest research to specialize all treatments and equipment to the unique needs of burn patients, and employees participate in extra training to ensure they are experts in their field.

"I've learned a lot while working here; it's a very different physical therapy than most," said Sgt. Scott Stapleman, a physical therapy technician. "We do a lot of things here that you just don't do in regular physical therapy. Because of the physiological changes from burns, we use tilts to increase vascular flow, lung capacity and things of that nature … a lot of compression on extremities that you don't do in normal rehab. I love working here. It would be a great opportunity for someone to come here after getting a start in regular physical therapy. The experience of working with burn patients will aid them wherever they go in the future."Roman explained that a lot of what they do focuses on edema control – controlling the swelling caused by fluid retention – and preventing scar formation."Scars prevent range of motion, so we try to prevent them from forming — whether it is scars that prevent the patient's use of their fingers, mouth or ventilation," Roman said.

When scar tissue forms, the skin becomes less elastic and cannot extend as much as uninjured skin. Therapists at the burn center use splints and slings designed by the research team specifically for burn patients to keep their bodies in positions that will elongate their joints while they are healing. These methods, combined with compression and gentle stretching, help patients retain their range of motion.

Sgt. 1st Class Russell Gilmore, the NCOIC for burn physical therapy, talks about the conformer machine they use to make silicone masks, which provide compression to facial burns as they heal. (Photo by Meghan Portillo)

"Whether you are a Soldier, a spouse or a mechanic, the less you can move a joint, the less you will be able to do the activities you need to do," Gilmore said.To control swelling for patients with fresh burns, therapists use wraps to put a certain amount of pressure where it is needed the most. Once a scar has matured,

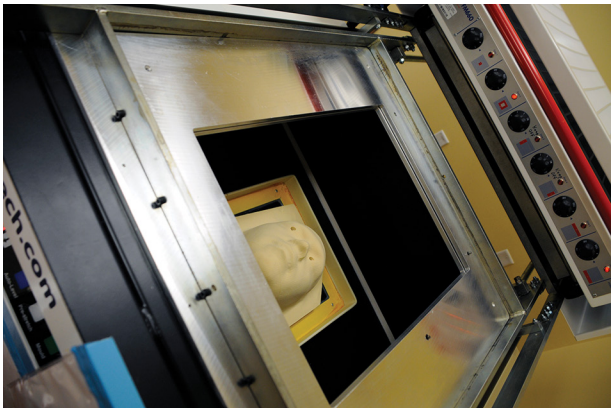
technicians create custom compression garments for a patient's arms, legs, chest or other areas to be worn like a shirt, sleeve or glove. The garment provides protection from ultraviolet radiation and even pressure to the area to prevent swelling and further scar growth.If a patient is burned on his or her face, therapists use custom-made silicone masks held in place with a hockey mask-like harness to apply the needed pressure.

"Compression is key in recovery," Roman said. "For facial burns, material is applied to the burn victim's face using the compression mask. And that's going to influence whether the patient retains many of their facial features or not. Because of edema and other changes a patient goes through, they may go through several masks. Using the old equipment, it would take 8 to 10 hours to create a mask. With the equipment we have now, it takes us 30 to 45 minutes. We take a scan of the patient's face and manipulate the scan, make a mold of the face with a milling machine, then apply the thermoplastic material to create the mask."

For patients who are unconscious or bed-bound for lengthy periods of time, therapists use mechanized chairs or frames that can lift a patient from a flat position into a sitting or standing position. Even if the patient is still unconscious, sitting and standing are beneficial because gravity helps push fluids throughout the body. The frames also have an attached table, and the therapists encourage patients who are able to use their arms and hands and to engage in activities."We always try to disassociate the patient with their pain," Gilmore said. "They may be horrifically burned; it's very, very painful. Sometimes, if we ask them to do something, and that pain is their area of concentration, they are not going to be able to fully do what we want them to do. So if we can get them thinking about something else, the pain is still there, but they are not thinking about it, so it becomes more bearable."I remember we were trying to get a patient up to standing for an hour, but we couldn't do more than 10 or 15 minutes before he was just in too much pain. We found out that he liked to play chess. I like to play chess, so we brought the standing frame in there, I started playing chess with him, and hours would fly by. Within a couple of days, he was walking again. The pain was still there the whole time, but I got him concentrating on the game, and he was able to cope."

Reintegration

As patients continue to heal, the therapists begin to help them walk again. The hallway between the burn unit and the rest of the building, featuring windows from floor to ceiling, is referred to as the "rehab hallway," because it has a rail system installed along the ceiling to which a patient can be attached with a harness. Patients gain confidence using the system as they try walking for the first time, knowing it will catch them if they fall or lose consciousness.



Using a scan of the patients face, technicians use a milling machine to create a mold. The conformer machine, pictured, then heats the silicone and uses suction to seal the material to the mold. "This machine is very unique to what we do here," Gilmore said. "I've never seen one like it anywhere else." (Photo by Meghan Portillo)

"Within a day or two, they are usually running up and down that hallway," Gilmore said. "They get over their fear. It gets them out of their room; they get all that sunshine and see the world a little bit.

"We try to get them out doing exercises near someone else who is going through what they are going through," Gilmore said. "Maybe that person is a little further along in their treatment, so the patient can see the progress they can make. It provides a light at the end of the tunnel. It helps a lot for them to have others going through the same thing to talk to and ask questions."

Roman said he is always astonished at the rate of patients' progress once they are able to venture out of their rooms and mingle with other patients and family who could not visit them in their rooms. This reintegration goes a long way to helping patients get back into society, whether as a civilian or back into the military.

To prepare patients for their life outside of the hospital, therapists use an "activities of daily living" room – a small but fully functional apartment that mimics a household where they will eventually need to function independently. They use the room to work with patients on basic needs such as meal preparation, hygiene, transfer from the showers, getting dressed, washing dishes and doing laundry.

"Working with patients here helps us to determine when a patient is ready for discharge and what modifications will be needed at their home before they move," Roman said.

New research: the future of patient care

In the past few decades, researchers have made leaps and bounds, Gilmore said. The burn victim survival rate is much higher than it used to be, but there are still many unknowns when it comes to scar formation and other as-

pects of patient recovery. To address this, the burn center has its own research department, which publishes studies through the American Burn Association.

"If we keep their arms elevated for a longer period of time instead of just a few hours a day, will their progress be faster? With the new techniques and technology being developed through our research, patients' rehabilitation has become much more effective," Gilmore said.

NCOs who are technicians as well as NCOs who are health care providers in the burn center play key roles as part of the research team.

"Working with clinicians is crucial to research to make sure the things we develop are going to be useful in that clinical environment," Baer said. "So the NCOs are very useful in helping us understand the best ways to treat patients and ways we can improve patient care."

Roman said a great part about the burn center having its own research team is that not only are NCOs involved in the research – which doesn't happen very often – but they are also able to apply the findings right away, whether it be new methods in the operating room or the use of virtual reality instead of drugs for pain management.

One advantage patients at the burn center now have is that of replacement skin. The main treatment used for burn patients continues to be skin transplants from their own bodies, but because donor sites are painful and there is often not enough skin to cover large burns, research efforts have been focused on developing synthetic options that require little or no skin from the patient.

Burn victims at the ISR burn center may now participate in the clinical trial for ReCell, a spray-on skin made from a small biopsy of the patients' skin. The biopsy is used to create a substance containing keratinocytes, regenerative cells that promote the growth of new skin cells.

"We surgically remove any skin that is burned, and then the sprayed skin sort of 'seeds the lawn' and helps with the growth of new skin. Those cells actually grow in place and create new skin. It is amazing," Baer said. "Not only can those who get treated here at the burn center enroll in an experimental protocol like this, but everyone across the country can benefit from that. We know it will make the care for Soldiers better, in addition to the care for civilians who are burned in accidents and such."

Another method now in clinical trials is the use of skin sheets. A small sample of skin is taken from the patient and sent off to a company that puts it in a culture and grows it into sheets. The sheets of skin are sent back to the burn center and applied to the patient's burns.

"It's good to have more than one option for treatment," Baer said. "The use of spray-on skin is limited by the depth of the burn, but we can use it immediately. You don't need to send the cells off to another company to grow them for a few weeks and send it back. So it's faster. The other kind takes longer, but it has a better outcome for full thickness, third-degree burns."

An experimental line of research in an earlier phase involves the use of adult stem cells harvested from fat that would normally be discarded in surgery to create "off-the-shelf skin." The spray-on skin will hopefully not require any skin from the patient, and will be ready to use on any type of burn, whenever a patient needs it.

"The research is very significant. It is what makes us unique," Roman said. "We can apply this immediately, whereas other burn centers in the U.S. do not have that luxury. They may learn from our published studies and apply it in their own clinic, but we have that advantage right away."

NCOs work in every aspect of the burn center to make the facility the best in the country. From conducting research to changing the dressings of a Soldier's burn, they are the ones getting things done, who observe and share in each patient's victories — great or small. Whether a patient's goal is to walk again, live on their own, get back to their family life or even to their job in the military, NCOs help them get there. ■

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