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After rescue, miners face physical, psychological issues

Recovery includes dealing with eye damage, lung conditions and relationship

By Wynne Parry



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After the 33 trapped Chilean miners travel to the surface, one by one in a rescue capsule, the isolation and darkness they have experienced for more than two months will end, if all goes as planned. But this won't be the end of their journey back to life as they knew it.

The men face potential physical problems ranging from **fungal infections** to sunburned eyes upon reaching the surface. There are possible **psychological issues** such as post traumatic stress disorder. The could find that re-integrating into their lives and relationships is stressful, as loved ones may have adjusted to life without them. And then there's the throng of media to deal with, and the inevitable book and movie proposals.

But it isn't all necessarily painful. Others recovering from similar experiences have reported feeling a new sense of intoxication with life.

Ben Sherwood, a former journalist and author of "The Survivors Club: The Secrets and Science That Could Save Your Life" (Grand Central Publishing, 2009), said his research led

him to a simple conclusion: "The single common denominator is people are much stronger than they realize and much more resilient."

On the way up

On Aug. 5, the roof of a gold and copper mine in northern Chile collapsed, trapping 33 miners, who took shelter about 2,200 feet (670 meters) below the surface. On Aug. 22, the first borehole drilled by rescue workers reached the miners, opening up a lifeline with the surface. [[Infographic: Chilean Mine Collapse](#)]

While Chilean **health** officials are reportedly prepared to treat vitamin D deficiency (due to lack of sunlight), partially collapsed lungs from shallow breathing, eye damage from lack of l

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ight and fungal diseases caused by the extended stay underground, the trip toward the surface has its own medical concerns.

Estimates for the ascent time have varied, but Michael Duncan, NASA's deputy chief medical officer, says he thinks it's about 15-20 minutes right now, with a rate of 2.2 mph (1 meter/sec) initially.

"If they're going to be in that confined cage essentially standing at attention, there might be some risk for getting faint or passing out during the course of the trip," Duncan said today (Oct. 12) during a telephone interview.

The miners are expected to down salt water, in what astronauts call a "fluid-loading protocol," to help prevent fainting. Duncan also discussed with Chilean colleagues compression garments that could keep the central blood flow up, though there's no word those will be used.

Once the miners reach the surface, there's **bright, desert sunlight to contend with**. And while their eyes should adjust as they normally do when going from dark to light, they will wear sunglasses to ease the transition. In addition, the sunglasses should help prevent any damage to their corneas, Duncan said.

"The concern discussed with our Chilean colleagues is whether or not there's a risk of irritation of the **cornea** due to UV exposure, similar to snow blindness," Duncan said, adding it's essentially sunburn to the cornea (the clear outer covering of the eye).

Overall, the miners seem to be in good health, though extra attention will be paid to the individuals with prior health conditions, including one with a lung condition and another with diabetes.

"Even when they're not trapped in the mine, when they're working in the mine, they're **exposed to very dusty conditions**," Duncan said. "And they've been exposed to these conditions for 68 days of constant exposure. That may cause some problems."

The miners will be evaluated for any respiratory infections, and will be monitored to make sure they don't experience any deterioration of the lungs, he said. Even with the health risks linked to the dusty environment, miners were still allowed to smoke while confined.

"The risk-benefit ratio was weighed, and it was felt that allowing the miners to smoke in the

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short term was better for them to be able to handle stress than the medical risk," Duncan said.

The Chilean doctors took preventive health initiatives, such as sending down vaccines for pneumonia and influenza, Duncan said. A miner who had taken care of a sick family member in the past administered medical care.

The long haul

While their bodies are mending, their minds may also need a lift. The miners are at risk for post traumatic stress disorder (PTSD), a severe anxiety disorder brought on by a traumatic event, as well as anxiety or depression, according to Don Catherall, a clinical psychiatrist at Northwestern University who specializes in trauma and the impact it has on relationships.

"The primary thing that they should be on the lookout for is whether they feel like they're still down inside the cave, re-experiencing it as if they've never gotten out, even if they have," Catherall told LiveScience.

The effects can be delayed, so it's reasonable to wait six months to see how they are doing, he said.

Nick Kanas, a University of California, San Francisco psychiatrist who has studied the psychology of astronauts and others working under stressful and isolating conditions, said one source of stress to the miners could be re-integrating into their families after a prolonged absence during which dynamics

may have changed.

"The astronauts and other people who've been in isolation that we've studied It's important to give them private time so they can re-integrate after months of being separated from their families and friends," Kanas said.

Studies of families of men on Navy submarines found that their wives and families adjusted to their absence, but when the men came home and wanted to reassert their roles, some families experienced discord, depression and other difficulties, he said.

A second stressor

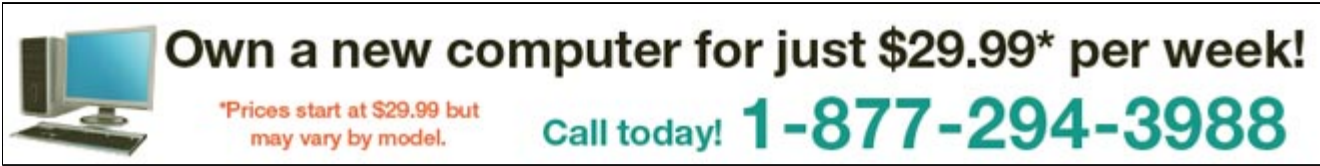
The camp above the miners has been estimated to contain more than 1,000 journalists from around the world. Media frenzy is expected to greet the miners, and there is talk of book and movie deals. In preparation, the miners have received media training from a Chilean former journalist, and

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have said they want to make a legal pact to share the proceeds of any deal, according to media reports.

The intense attention can pile onto the stress of returning to one's family, according to Kanas.

"These people are going to be suddenly thrust into kind of an unaccustomed role," he said.

The miners and their families, however, appear aware of what is to come, according to Sherwood.

One family sent a note with a photo of Elvis Presley down to one miner, telling him he would soon be more famous than Elvis, Sherwood said.

A light at the end

By taking measures like creating an internal emotional support group, opening communication with loved ones and dividing themselves into three shifts, to sleep, work and relax, the miners and rescue workers have done an excellent job of managing the stresses of the situation, according to Michael Poulin, a psychologist who studies the social component of adjustment to stress and traumatic life events at the University of Buffalo in New York.

The communication between the miners and the surface, in particular, creates a "big plus" in their favor, Poulin said. "They're virtually certain there is a light at the end of the tunnel. They know this is going to turn out well.

Nobody died, they are getting out. In fact they are getting out sooner than originally scheduled."

Once the first borehole reached the miners, rescuers estimated it could take as much as four months to retrieve them.

Given that research has shown that those who undergo traumatic or stressful events are resilient, Poulin is optimistic for the miners.

"My guess is given the generally positive circumstances that have accompanied the challenges they have faced, they are going to do, as whole or in general, quite well," he said.

Euphoria

Some of the effects from confinement may be subtle.

After two years inside an enclosed ecosystem as part of the Biosphere 2 mission, Taber



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MacCallum, noticed two odd things during his re-entry.

"I didn't have the habit that puts the keys back in the pocket and makes sure the car door is locked. There are hundreds of little habits that we accumulate through the day to day living that help us get by, and we didn't have any of those," said MacCallum, who is CEO of Paragon Space Development, which builds life support systems for extreme environments.

He also found that he relished life.

"I really enjoyed taking a mental note of everything I did for the first time. The first strawberry, the first hamburger, the first pizza, the first beer," he said. "I was sort of able to re-experience the world like a grown-up child."

Those who survive a traumatic event can have a similar feeling, according to Sherwood.

"Life itself, when you come so close to death, is a very intoxicating thing," he said.

Nando Parrado, one of the Uruguayan rugby players trapped for two and a half months in the Andes after a 1972 plane crash has written about this sensation, according to Sherwood.

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