

Therapeutic focus - Rival exoskeleton developers address different markets



[Elizabeth Cairns](#)

With the first powered exoskeleton gaining approval in the US and its developer, ReWalk Robotics, intending to go public, these innovative technologies are attracting a lot of investor attention. ReWalk is some way ahead of the competition in terms of approvals, but other systems offer different advantages, and in a large market there could be room for all of them.

The difficulty is price. These systems are expensive, ranging from \$70,000 to \$150,000, and in a climate characterised by cost cutting they will have to demonstrate significant advantages over current technology - wheelchairs used with standing frames - if they are to obtain reimbursement.

There are two distinct markets for these walking suits: rehabilitation and personal use. Patients with spinal cord injuries or other forms of paralysis have fewer infections, bone and muscle wastage and other complications if they stand for an hour each day ([Robotic exoskeleton company ReWalk marches to Nasdaq, July 11, 2014](#)). This can occur at home or at a rehab centre.

ReWalk has had the first success in the personal use market, though it is also active in the rehab arena. "Our system is intended for independent use, and you can use it in virtually any setting. The FDA clearance as well as our CE clearance allows for use at home and is totally managed by the individual," Larry Jasinski, ReWalk's CEO, told *EP Vantage* before his company filed for IPO.

Personal vs rehab

Two other companies, the UK/New Zealand firm Rex Bionics and California's Ekso Bionics, are focused on the rehab space. Ekso's system is similar to ReWalk's in that both require crutches to help the user balance.

But Ekso is not positioning its suit for personal use. "It's really a rehabilitation device," Ekso's Heidi Darling said in a telephone interview. "We're able to impact more people's lives in a medical facility - eight people in a day can use the device and walk, versus one person purchasing it. We're also able to collaborate more with doctors and get more feedback to develop the technology."

Rex's suit is markedly different from the other two: it does not require crutches and has more motors than its rivals, and so can treat patients whose conditions are more severe. It is, however, a long way off FDA approval.

"The rationale at first was to build bespoke ones," Jeremy Curnock Cook, Rex's CEO, said in a face to face meeting with *EP Vantage*. "At a cost of \$150,000 we were really addressing a high-net-worth market. So we paused to develop the rehabilitation version of Rex, a rapidly adjustable version."



The rehab version of Rex Bionics' exoskeleton. Photo credit: cjansenphotography.com. Image has been cropped.

Unfortunately neither system, in its current state, is viewed by the FDA as suitable. "They were not things that we could get FDA approval for because they had been constructed in completely the wrong way. You've got to show how you thought it through, and the other piece is the software that drives it: the FDA likes an FDA-approved operating system, onto which you can put other instructions." Rex is now working in a new version of its exoskeleton that it hopes to file with the FDA in 2017.

ReWalk therefore has the US market to itself for now. "We seem to have a lead of a few years," Mr Jasinski said. "The FDA has determined that all exoskeletons are class II [moderate risk] devices." There was some early effort by Rex and Ekso to sell as a class I device, but both companies will now have a long cycle before they are able to be active in the US.

The current state of play is that ReWalk has devices in more than 50 rehab facilities, Ekso has placed close to 60 of its systems in rehab centres, and Rex has sold 14 suits, most of which are the rehab model.

Two other companies, US group Parker Hannifin and Japan's Cyberdyne – the same name as the firm in the Terminator films – are also working on robotic suits, but are further behind.

Reimbursement

The requirement for crutches for the Ekso and ReWalk systems is perhaps less than ideal, but Mr Jasinski said ReWalk's device was not only cheaper at \$69,500 but also enabled faster movement. "It's more important to walkers to have functional walking speed. If you have to cross the street you need predictable speed and with crutches you've got a way to balance yourself and the system. The speed makes this very practical for everyday use – the Rex product is not in that category."

Ekso's Ms Darling echoes this: "When I look at Rex I see the space it takes up and I think people would rather, in general, use crutches than have a big bulky suit."



Ekso's exoskeleton. Photo credit: Ekso Bionics. Image has been cropped.

Mr Cook of Rex agrees, saying that Rex's product is not designed for speed. However, he said that most patients do not want to go fast because they are numb from the waist, and sometimes the chest, down. "If you want to get somewhere fast, in a comparable speed to the wheelchair [use ReWalk or Ekso]. Whereas we're trying with Rex to make something rational for wheelchair users."

But regardless of their market niches, size and speed, the factor that will affect uptake most profoundly is cost, and whether the companies can persuade payers to reimburse them. Rehab use may be the easier path here, since hospitals can claim the cost back use by use. Ekso's suit costs \$110,000, Ms Darling said, but this is not necessarily a problem. "We are going after stroke and spinal cord injury centres, where they're buying imaging equipment for \$3m; having a suit for \$100,000 isn't a huge capital expense," she says.

Persuading providers that exoskeletons are worthwhile for personal use will probably be harder, though Mr Jasinski said ReWalk had gained reimbursement for its personal model in Germany. Other payers, notably insurers in the US, are likely to follow only if developers can provide compelling clinical evidence that exoskeletons are significantly better than the much cheaper wheelchairs and frames with which patients are familiar.

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