Powered Exoskeleton

By- Andres Montano and Emily Hernandez

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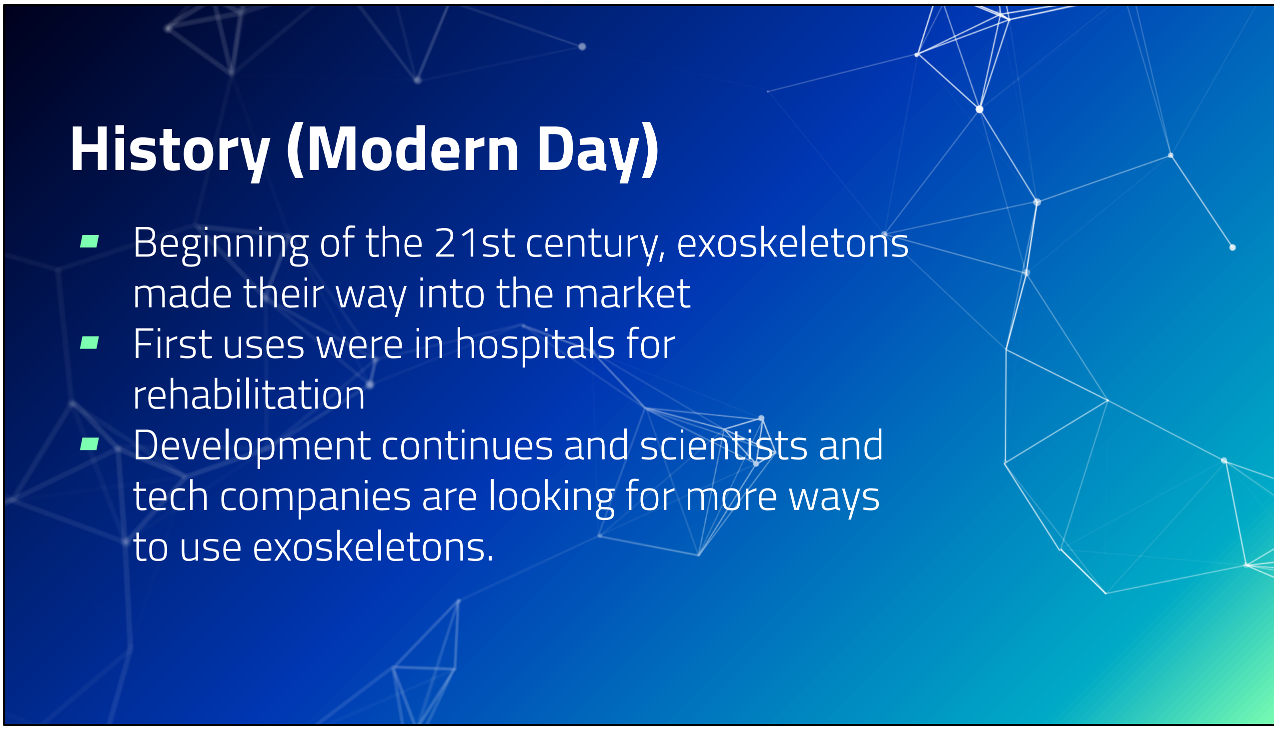
History (Build-Up)

How it started:

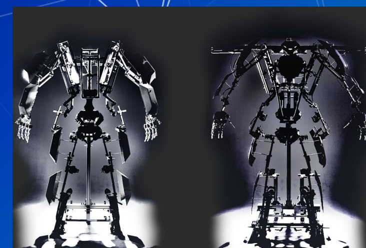
- 1965- US development for hardiman , Exoskeleton to help users strength
- First exoskeletons developed end of 1960s at Mihajlo Pupin Institute Serbia
- First in the US in the 1970s at Wisconsin-Madison University

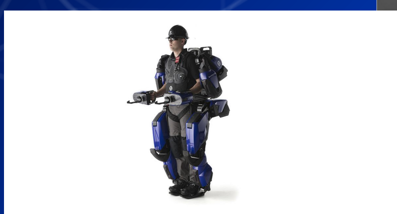
The development of robotic exoskeletons already began in the second half of the 20th century. Around 1965, General Electric (in the US) started to develop the Hardiman, a large full-body exoskeleton designed to augment the user's strength to enable the lifting of heavy objects. The first exoskeletons for gait assistance were developed at the end of the 1960s at the Mihajlo Pupin Institute Serbia, and in the early 1970s at the University of Wisconsin-Madison in the US



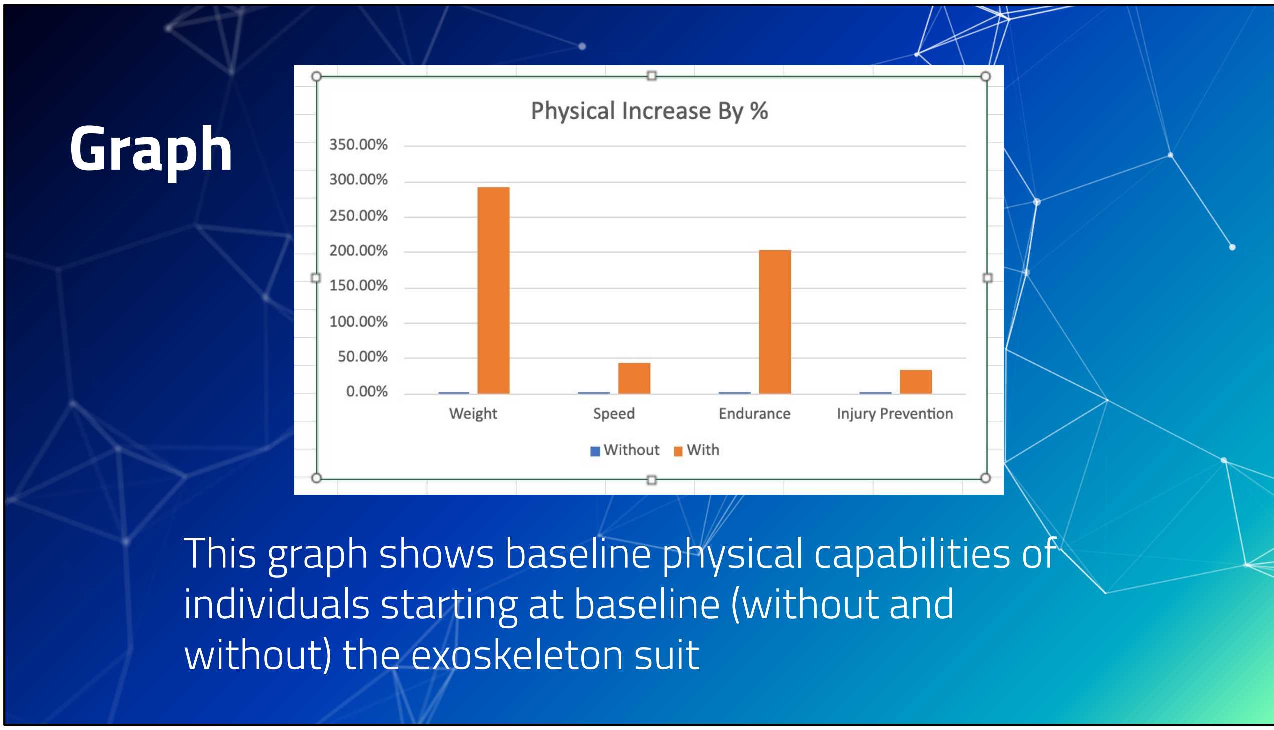
With the beginning of the 21st century, the first exoskeleton products made their way to the market and are accessible to an increasing number of users. One of the first applications was gait rehabilitation in stroke and spinal cord injured patients. An early example is the gait rehabilitation exoskeleton Lokomat that was released in 2001 and is used in hospitals and rehabilitation centers worldwide. In 2013, the company behind the Lokomat (Hocoma AG) announced the shipment of the 500th device.

What it would look like:





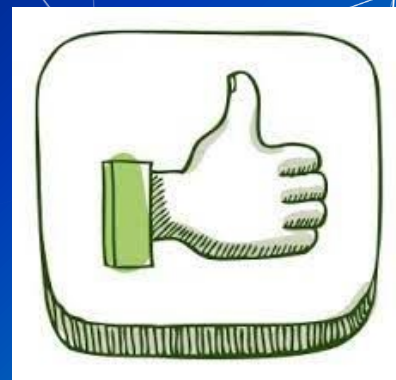
slightly less incredible version of Iron Man's suit may enable U.S. soldiers to run faster, carry heavier weapons and leap over obstacles on the battlefield. And at the same time, it'll shield them from the effects of bullets and bombs. defense contractor Raytheon demonstrated the experimental XOS 2 -- essentially, a wearable robot guided by the human brain -- that can lift two to three times as much weight as an unassisted human, with no effort required by the user. It's possible that someday people with spinal injuries or muscle-wasting diseases may get around as easily as fully-abled people do, thanks to full-body devices -- essentially, wearable robots -- that enable them to do what their own muscles and nerves can't. They can provide support and reduce fatigue. They even enable people in wheelchairs to stand up and walk again.



51-200- Weight
0%-42%- speed
3.2 min- 9.7 min- endurance
0%-10% to 44%- injury prevention

pros

- Improves strength
- Improves endurance
- Improves productivity
- Decreases risk of injury
- Allows more complex movement



Workers using exoskeletons experience less fatigue, with the ability to complete more work than their bodies could typically handle due to the decreased strain on various body parts. Studies show that exoskeletons increase productivity from two to 27 times, depending on the task at hand, allowing operators to work 30 minutes or longer without requiring rest breaks. One of the main goals of robotic exoskeletons is to combat fatigue in the workplace. In 2019, the most common cause for workplace injuries was extreme fatigue and overexertion, with 20 percent of construction workers reporting severe pain. In fact, construction workers are 5x more likely to report poor health. Providing postural support that can follow the movements of the arms without misalignment or resistance can generate a 30 percent reduction in stress on the shoulder muscles. Perceived discomfort measures how hard a person feels he or she is working, used to measure the physical activity intensity level. Exoskeletons have been shown to reduce perceived discomfort in all body areas, including forearms, neck, shoulders, upper arm, upper back, legs and lower back.

Heavy and Bulky Exoskeletons tend to be bulky and some can be heavy. Although it helps a worker improve performance, it can be disadvantageous due to its weight. Speed Exoskeletons offer a range of varying speeds and most are characterized by a modest speed that is slightly greater than 0.2 m/sec, which may impede their general use. Handgrip Many spinal cord injury patients may not be able to use an exoskeleton due to the lack of appropriate hand grip. Pressure Injuries Around 70%-75% of persons with spinal cord injury experience pressure injuries during their lifetime with dramatic changes in their skin structures that are likely to break down with a minimal amount of shear. Powered exoskeletons are likely to have straps to help to maintain static and dynamic posture during standing and walking. With diminished sensation and impaired peripheral circulation, these straps are likely to cause excessive shear to the surrounding soft tissues and may lead to pressure injuries. Price The biggest drawback of exoskeletons is their prices. An exoskeleton can cost around $45,000, and that is why many people cannot afford them.

summary

Overall this rising technology would be beneficial for certain industries like construction where physical labor could be intense and long. It could also be very beneficial in the anything physicality is needed like the military and can even help those with medical conditions and those who are recovering from injuries. This is a trusting technology and at the moment closest thing humans can get to super strength and sci-fi robot suits.

references

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