Cleveland Clinic Innovations

PRODUCT
Exoskeleton for Surgeons

INDICATION
MSK Injury, OR Accessory, Ergonomics, Surgical Suite

VALUE PROPOSITION
- Redirect loads resulting from holding postures that stress the spine
- Prevents MSK injuries and their negative impacts
- Improves performance and posture

DEVELOPMENT STAGE
- Prototype with promising CCF user feedback

INTELLECTUAL PROPERTY
- Patent Pending

SELECTED PUBLICATIONS
- None

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S[erg]ICAL Exoskeleton – Improving Ergonomics in the Surgical Suite

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UNMET NEED

Various occupations require people to assume postures that can put considerable stress on their spine and result in a musculoskeletal (MSK) injury. For instance, surgeons and other surgical staff often assume a head-forward hunched position and/or bending at the waist to optimize their visual field during surgery, sometimes for many hours. Over time, the stress from maintaining such postures during surgeries can have negative implications to both their individual health and the potential care they can provide to patients if they require time away from work or reduced workloads to recover from associated spine injury. For example, a 2014 study published in Journal of Surgical Research found that 50-85% of physicians in surgical specialties report symptoms of MSK injury in the workplace. Moreover, a 2017 meta-analysis study published in JAMA Surgery found that due to work-related injury disorders, 12% of physicians required a leave of absence, practice modification, or early retirement. Similarly, numerous surveys and research studies have been reported and highlight the issue of chronic pain for surgeons, which can lead to them requiring extended time off, modification of their practice, or even early retirement. To further emphasize this point and put this issue into perspective for non-healthcare fields, research has shown that prevalence of cervical pain among surgeons is 2x higher than that of construction workers. Even with the prevalence of these MSK injuries, there remains little innovation in surgery for improved ergonomics. Accordingly, an appliance that can provide support to the human body and help to redirect loads resulting from holding postures that stress the spine (e.g. hunching, leaning forward, twisting, etc.) for extended periods could help prevent such injuries and their negative impacts.

SOLUTION

The S[erg]ICAL Exoskeleton will give the surgeon a menu of options relevant to their specialties or surgical maneuvers to improve performance and posture by redirecting stress-position loads and providing sacral support.

Surgeon Focused Design