MUSCULOSKELETAL DISORDERS

Using Wearable Technology to Address Three Categories of Risk

By Toni-Louise Gianatti

Musculoskeletal disorders (MSDs) are disruptive and costly for workers, employers and society. Wearable technology can help address the risks of injury and keep workers engaged in the process by enabling them to self-manage their safety.

Wearable technology used for safety has already developed beyond the nascent stage, and is becoming readily available to help reduce injuries and increase awareness in many aspects of safety for individuals and organizations alike. Because of the fast-paced advancement of the technology, safety departments can address all categories of risk factors related to MSDs with one tool, saving organizations time and money.

MSDs cost the individual, the organization and society. According to Bureau of Labor Statistics (BLS, 2018), MSDs involving the back accounted for 38.5% of all work-related MSDs in 2016, or 134,550 back-related cases out of 349,050 total cases.

Risk factors around MSDs at work can be categorized into three areas: the individual (psychosocial and physical behaviors and limitations), the environment and the task. One benefit of wearable technology is that it can be used to address all three factors to limit exposure to workplace musculoskeletal injuries and help to reduce the high-risk movements that often lead to injury.

The Individual: Using Biofeedback, Personal Data & Microlearning

To move correctly with low risk, an individual must have a certain amount of body awareness of his/her own movement patterns and performance. Body awareness can be defined as both the way one experiences his/her body in space and the sensory input s/he responds to while moving the body (Sundén, Ekdahl, Horstman, et al., 2014).

Sensors send biofeedback alerts to the worker, advising when a high-risk movement is being performed to help with kinesthetic sense (i.e., awareness of position and movement) and proprioception (i.e., force, effort and balance), thus decreasing the risk of injury and the likelihood of other common work injuries (e.g., slips, trips and falls). Having awareness of how the body is moving in space allows individuals to improve their technique rather than continue to perform movements that are habitual or following old patterns of behavior.

Real-time personal data such as detailed graphs and information about how individuals are performing actions (e.g., bending, twisting, lifting) provides workers with a self-paced ability to change their movement patterns and understand how to correct and self-manage their own musculoskeletal safety. This incentive not only improves worker well-being with effects throughout their work, but what they learn can transfer to their home life as well.

Microlearning allows workers to complete their education at a time and place that suits them. This ensures that the user is present while learning, which allows for increased retention due to the voluntary nature of the learning (Perry, 2017). These bite-size chunks of information facilitate learning on the go and reduce internal cost to organizations, as most of the training is delivered while the employee is working. As opposed to classroom-based safety training that can be less engaging and more costly for business due to loss of production time, microlearning is flexible and works with how the brain retrieves and stores information to produce a positive result. Self-directed microlearning also promotes better learning outcomes if blended with follow-up education such as traditional classroom lessons, and allows information to be digested and then reinforced during face-to-face settings (De Gagne, Park, Hall, et al., 2019).

The Environment & the Task: Using Data Analytics

With a measure-everything mindset, data-driven, objective insight will help an organization gain clear information on any areas of the workplace that need improvement (Schall, Sesek & Cavuoto, 2018). This not only allows monitoring of the task and its suitability to the individual, but also provides data on how a department is performing with organizational risks. Using data, safety champions can be rewarded through incentives. Repetitive hazardous movements can be identified, interventions implemented, and any work-rest cycles can be seen. Fluctuations throughout work shifts or weeks can also be recorded and used to elicit any change required.

Many approaches for reducing injury risk in the workplace exist; however, analyzing real-time data can help an organization identify emerging needs as they arise. Using in-depth analysis to research and evaluate the tasks performed, the individual and the workplace environment, an organization can gain insight to make immediate changes designed to reduce injury risk and help keep workers safe.

Increasing Employee Acceptance

According to research by Schall, Sesek and Cavuoto (2018), approximately 80% of OSH professionals would consider using wearable technology to help track and monitor risk factors at work. However, research has shown that the way technology is presented to workers makes a

KENTOH/ISTOCK/GETTY IMAGES PLUS

significant difference in the adoption of the solution and whether related goals are achieved (Jacobs, Hettinger, Huang, et al., 2019). Use behavior and positive outcomes from using wearables for safety are largely dependent on the management approach. Engagement strategies are key to gaining best results. Ensuring trust and reducing fear about the use of any wearable technology are also key (Jacobs, et al., 2019).

A study regarding employee acceptance of wearable technology in the workplace concluded that to obtain best possible outcomes when implementing wearables for safety, the following four factors should be considered:

1) provide employees with sufficient evidence that the technology will yield the desired results and will in turn increase their safety;

2) involve employees by giving them incentives and providing an opportunity to discuss and be a part of the technology implementation process;

3) foster a positive and enthusiastic culture around safety;

4) record data only while employees are at work (Jacobs, et al., 2019).

Mentally preparing workers in advance will reduce their resistance to the technology. Open communication to assure workers that the technology is for their own safety, both on and off the job, will help create a more receptive audience (Jacobs, et al., 2019).

Using wearable technology that incorporates biofeedback, personal data and microlearning, coupled with data analytics and scrupulous communication to workers about the use of wearable devices can help organizations significantly reduce injury risk in the workplace. **PSJ**

References

Bureau of Labor Statistics (BLS). (2018, Aug. 28). Back injuries prominent in work-related musculoskeletal disorder cases in 2016. Retrieved from www.bls.gov/opub/ted/2018/back-injuries-prominent-in-work-related-musculoskeletal-disorder-cases-in-2016.htm

De Gagne, J.C., Park, H.K., Hall, K., et al. (2019). Microlearning in health professions education: Scoping review. *Journal of Medical Internet Research Medical Education, 5*(2). doi:10.2196/13997

Jacobs, J.V., Hettinger, L.J., Huang, Y.H., et al. (2019). Employee acceptance of wearable technology in the workplace. *Applied Ergonomics, 78*, 148-156. doi:10.1016/j.apergo.2019.03.003

Perry, M. (2017). Learning trend: Microlearning. *Canadian Journal of Medical Laboratory Science, 79*(2), 7.

Schall, M.C., Sesek, R.F. & Cavuoto, L.A. (2018, Jan. 10). Barriers to the adoption of wearable sensors in the workplace: A survey of occupational safety and health professionals. *Human Factors, 60*(3), 351-362. doi:10.1177/0018720817753907

Sundén, A., Ekdahl, C., Horstman, V., et al. (2014). Analyzing movements development and evaluation of the body awareness scale movement quality (BAS MQ). *Physiotherapy Research International, 21*(2), 70-76. doi:10.1002/pri.1618

Toni-Louise Gianatti is product manager and training content developer for Soter Analytics (www.soteranalytics.com). She has more than 20 years of integrative movement coaching experience, specializing in fascial and somatic awareness with a focus on reprogramming body maps to break faulty movement habits and reduce injury risk.