WHSC WORKERS HEALTH & SAFETY CENTRE

The case for worker involvement

Participatory Ergonomics

The right of workers and their representatives to participate in identifying and recommending solutions to health and safety hazards at the workplace is enshrined in occupational health and safety law, both provincially and federally. How consistently these rights are complied with and/or enforced in the workplace is another matter. And yet, there is a significant body of literature that demonstrates worker involvement is key to safer, healthier work. The prevention of musculoskeletal disorders (MSDs) is no exception. Research shows worker involvement in reducing or preventing MSDs, otherwise known as "participatory ergonomics" is critical to the success of ergonomic change. Thus, if MSD prevention is truly the goal, then worker participation must be the cornerstone of all ergonomic efforts...starting now.[1]

Participatory Ergonomics—the who and how

The concept of "participatory ergonomics" is based on the premise workers best know their work and are in the best position to propose and implement ergonomic changes. Since it was first conceived in the 1990s, this approach has been endorsed by the National Institute for Occupational Safety and Health (or "NIOSH") and the European Agency for Safety and Health at Work (or "EASHW") [2]. Since publication of the CSA Standard on the Management and Implementation of Ergonomics in 2012 (and reaffirmed in 2017), it has been advocated, as well, in Canada.[3]

The process of crafting and implementing an intervention using participatory ergonomics consists of four steps: creating an intervention group to analyze the problem, reviewing and selecting a solution, instituting a solution; and, evaluating the efficacy of the intervention.[4]

While several participatory ergonomic approaches have been reported [5] in the literature over the past two decades, in the majority, the "ergonomic team" or work group forms the foundation of the participatory ergonomics model. Such a group includes representation from workers and the employer, and in many cases, an ergonomist, acting as a technical resource.[6] In all cases where ergonomic interventions were successfully adopted and implemented the group consisted of a worker or worker representative.[7]

The CSA standard also stresses the importance of worker participation, advising workers and their representatives should be assured sufficient time and resources to engage in the development, implementation and evaluation of all ergonomic interventions.[8]

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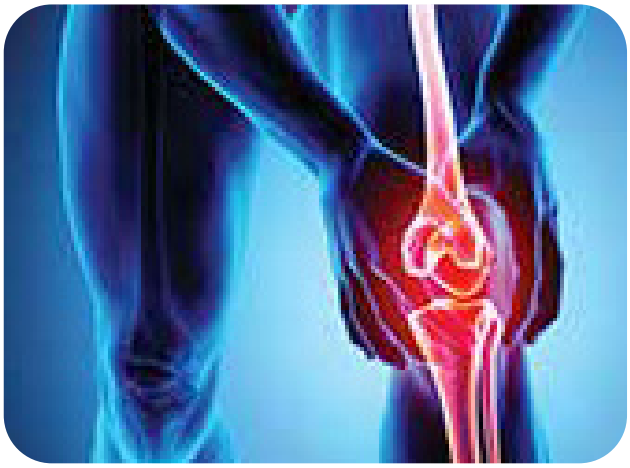
Participatory Ergonomics ... cont'd

A study by the Institute for Work and Health (or the "IWH"), in Toronto, Ontario, found effective participatory ergonomic interventions had five elements in common: defined roles for work group members, inclusion of additional actors, as necessary, beyond the group, decision making by consensus, adequate training of group members; and, no barriers to implementation.[9]

Their research formed the basis of a guide10 that has assisted many workplace parties in initiating their own programs.



Demonstrated benefits

The general benefits of participatory ergonomics are well known. They include enhanced worker acceptance of proposed and adopted changes; improved worker productivity and company competitiveness; and reduced incidence of and claims for MDSs.[11] [12] [13]

The current research includes several examples of ergonomic interventions that have proven successful in reducing or preventing work-related MDSs. Most indicate a multifaceted program, with several different interventions implemented together, more effective than interventions instituted singly. Specifically, interventions that include changes to work tasks, equipment and processes tend to be more advantageous than training and/or education alone.[14]

A systematic review of the value of participatory ergonomics completed by the IWH in 2008 found evidence that interventions implemented using this approach reduced the number of reported MSDs, the number of worker compensation claims and the number of days lost or absenteeism (due to musculoskeletal pain and disability).

More often than not, workers affected by the planned or adopted changes were members of the ergonomic intervention group. Decisions regarding what interventions to consider and adopt were almost always achieved through consensus. Group support for the intervention and communication between members were cited as two of the most important factors influencing success of the intervention.[15]

Documented case studies

One study published in 2010 reviewed participatory ergonomic interventions across four different workplaces, ranging from a small shirt manufacturing plant to two large auto parts producers. Based on an analysis of risk factors for MDSs, a multi-stakeholder group selected individual change projects. Specific interventions ranged from narrow to broad and were implemented over a period of several months to several years. They included the reconfiguration of individual work stations, redesign of parts racks to raise parts bins and equipping tools with anti-vibration wraps. In all cases, changes eased the pace and load of work.[16]

In another case, the launch of an e-commerce website at a large catalogue retailer led to increased sales, but also a sharp rise in the frequency and severity of low back pain and disability claims. A work group comprised of an equal number of workers and managers was charged with proposing solutions. Reconfiguration of the assembly line, from a straight to a circular one, led to the elimination of manual handling, greater flexibility in job pace and body positioning and a decline in back injury claims.[17]

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In another example, complaints of pain and/or discomfort in the upper extremities in cashiers at a large retailer of construction and home building materials prompted use of the participatory ergonomics approach. An ergonomics work group identified several high risk activities including postural overload and awkward positions due to manual material handling, variable work schedules and extended work days. Changes included redesign of the work stations and introduction of ergonomically designed chairs and keyboards. Interventions resulted in a decline in musculoskeletal pain and disability and an increase in productivity.[18]

Overexertion injuries in the service parts division of a major automaker led to the implementation of several worker led ergonomic interventions. These included a self-elevating powered vehicle for transporting parts throughout the facility and for reaching high bin locations, lift and tilt pallet trucks for packing small parts into larger bins and a single level telescoping conveyor used for delivering hand-held totes for subsequent sorting operations. Following these changes, risk factors for MSDs declined, most notably, the physical loads.[19]

In another study, participatory ergonomics was used to prevent low back pain and disability among a group of nursing aids in a long- term care facility in Denmark. The Participative Ergonomic Blueprint developed by University of Waterloo and the IWH in 2003 [20] was used to develop ergonomic work groups, identify risks and institute changes. The situation at these workplaces was unique in that the ergonomic intervention group was comprised solely of workers. Changes in work tasks, increased control over the planning and execution of such tasks as well as use of mobile lifting devices and two person manual lifts reduced the reports of back pain.[21]

Perhaps the most prominent Canadian experience of participatory ergonomics was published by the IRRST in 2006. The study included three different sized companies in Quebec. In every case, an ergonomic work group, mandated to analyze and correct work situations that could cause MDSs, was established. Changes were made in 77 per cent of cases. Most involved modifications in work station layout and design and tools and equipment. All resulted in a reduction in the magnitude of the risk factors.[22]

This said, for employers who are looking for a "direct" return on their investment in ergonomics, the literature also tells us participatory ergonomics (PE) can be beneficial to the bottom line. Reflecting on an award-winning study he led on participatory ergonomics, IWH Senior Scientist, Dr. Emile Tompa reported, "We analysed a PE program at a shirt manufacturer in southwestern Ontario that employed up to 295 workers, comparing the costs of setting up the program with its benefits. We learned that, for every dollar the company spent on the program, it saved $5.50 for a total net benefit of almost $295,000 over a four-year period."[23] (To learn more about similar cost/benefit analysis studies, see the Workers Health & Safety Centre publication, entitled, "The Economics of Ergonomics.)

Conclusion

Framers of occupational health and safety law in Ontario and Canada understood the value of worker involvement in occupational health and safety matters. When it comes to MSD prevention, clearly, the literature has also demonstrated the value of worker involvement. For decades, the participatory ergonomics model has proven exceptionally successful in reducing, if not eliminating MSDs. For those workplaces still grappling with the problem then, they need look no further than the involvement of workers directly affected by the conditions that give rise to MSDs.

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Endnotes

1. Cole, Donald, C., et. al., Reflecting on a program of participatory ergonomic interventions: A multiple case study, Work, 2009, 34: 161-178.
2. Zalk, D.M., Grassroots ergonomics: initiating an ergonomics program utilizing participatory technique, Annals of Occupational Hygiene, 2001, 45: 283-289.
3. Workplace Ergonomics – A Management and Implementation Standard (CSA/CAN Z1004-12 (R2017)), Canadian Standards Association, Toronto, Ontario, 2012.
4. Nagamachi, M. Requisites and practices of participatory ergonomics, International Journal of Industrial Ergonomics, 15: 371-377.
5. Haines, H. et. al., Validating a framework for participatory ergonomics (the PEF), Ergonomics, 2002, 45:309-327 and Haslam, R. A., Targeting ergonomics interventions – learning from health promotion, Applied Ergonomics, 2002, 33: 241-249, Vink, P. et. al., A participatory ergonomics approach to reduce mental and physical workload, International Journal of Industrial Ergonomics, 1995, 15: 389-396 and H.M. Haines, Participatory ergonomics. In: Handbook of Human Factors and Ergonomics, G. Salvendy, ed., 2nd ed., John Wiley and Sons Incorporated, New York, New York, 1997: 490-513.l
6. May, D. and R. Schwoerer, Employee Health by Design: using employee involvement teams in ergonomics job redesign, Personnel Psychology, 1994, 47: 861- 876 and Moore, J.S. and A. Garg, Use of participatory ergonomics teams to address musculoskeletal hazards in the red meat packing industry, American Journal of Industrial Medicine, 1996, 29 (4): 402-408.
7. Cole, Donald, C., et. al., Reflecting on a program of participatory ergonomic interventions: A multiple case study, Work, 2009, 34: 161-178.
8. Workplace Ergonomics – A Management and Implementation Standard (CSA/CAN Z1004-12), Canadian Standards Association, Toronto, Ontario, 2012.
9. Reducing MSD hazards in the Workplace: A guide to successful participatory ergonomic programs, Institute for Work and Health, Toronto, Ontario, 2009 at www.iwh.on.ca/pe-guide.
10. Chung, A.Z.Q., and S.I. Shorrock, The Research-Practice Relationship in Ergonomics and Human Factors – Surveying and Bridging the Gap, Ergonomics, 54 (5): 413-429 and Chung, A.Z.Q., et. al., What Do Human Factors and Ergonomic Professionals Value in Research Publications? Re-examining the Research Practice Gap, Ergonomics, 57 (4): 490-502.
11. Haims, M.C., and P. Carayon, Theory and practice for the implementation of "in-house" continuous improvement participatory ergonomic programs, Applied Ergonomics, 1998, 29 (6): 461-472.
12. Imada, A.S., The rationale and tools of participatory ergonomics, In: Participatory ergonomics, K. Noro and A.S. Imada, eds. Taylor and Francis Incorporated, London, England, 1991, p 30-50 and Rivilis, I., et. al., Evaluation of a participatory ergonomic intervention aimed at improving musculoskeletal health, American Journal of Industrial Medicine, 2006, 49:801-810.
13. Laitinen, S. et. al., Improving physical and psychological working conditions through a participatory ergonomic process: A before and after study at an engineering workshop, International Journal of Industrial Ergonomics, 1998, 21: 35-45.
14. Szeto, G.P., et. al., Multifaceted ergonomic intervention programme for community nurses: pilot study, Journal of Advanced Nursing, 2010, 66 (5): 1022-1034.
15. Van Eerd, D., et. al., Report on the Process and Implementation of Participatory Ergonomic Interventions: A Systematic Review, Institute of Work and Health, Toronto, Ontario, 2008.
16. Cole, Donald. C., et. al., Reflecting on a program of participatory ergonomic interventions: A multiple case study, Work, 2009, 34: 161-178.
17. Bernardes, Joao Marcos, et. al., Participatory ergonomic intervention for prevention of back pain: assembly line re-design case, Work, 2012, 41:5993-5998.
18. Cristancho. M. Y., Participatory ergonomics among female cashiers from a department store, Work, 2012, 41, Supplement 1: 2499-2505.
19. Ulin, S. S. and W.M. Keyseling, Case studies of ergonomic interventions in automotive parts distribution operations, Journal of Occupational Rehabilitation, 2004, 14 (4): 307-326.
20. Wells, R. at. al., Participative Ergonomic Blueprint, University of Waterloo and the Institute for Work and Health, Toronto, Ontario, 2003.
21. Rasmussan, Charlotte, et. al., A multifaceted workplace intervention for low back pain in nurses' aides: a pragmatic stepped wedge cluster randomized

    controlled trail, Pain, 2015, 156 (9): 1786-1794.
22. St. Vincent, M., et. al., participatory ergonomic processes to reduce musculoskeletal disorder: summary of a Quebec experience, Work, 2006, 27: 123-135.
23. RSI Awareness Day: Research Suggests Using Participatory Ergonomics, Institute for Work & Health, February 28, 2014, www.iwh.on.ca/media-room/news- releases/2014-feb-28.

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