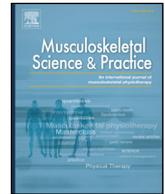




Contents lists available at ScienceDirect

Musculoskeletal Science and Practice

journal homepage: www.elsevier.com/locate/mksp

Cochrane review summary

Are ergonomic interventions effective for preventing musculoskeletal disorders in dental care practitioners? - A Cochrane Review summary with commentary[☆]

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The aim of this commentary is to discuss the published Cochrane Review, “Ergonomic interventions for preventing musculoskeletal disorders in dental care practitioners” by Mulimani et al.¹, under the direct supervision of Cochrane Work Group. This Cochrane Corner is produced in agreement with *Musculoskeletal Science and Practice* by Cochrane Rehabilitation.

1. Background

The profession of dentistry is associated with a high prevalence of work-related musculoskeletal disorders (WMSDs) among practitioners and symptoms may often start at the student phase of the career (Mulimani et al., 2018). WMSDs have been identified as a significant occupational health problem among dental professionals (Hayes et al., 2010). In dentistry, many cases of WMSDs are related to cumulative trauma, and are considered repetitive strain injuries. Risk factors for repetitive strain injuries among dental practitioners include gripping and using slender instruments in repetitive motions (such as for plaque removal and cavity preparation), and using vibratory instruments (Morse et al., 2003). Ergonomic interventions in physical, cognitive, and organisational domains have been suggested to prevent the occurrence of WMSDs, but clear evidence on the effects of ergonomic interventions is lacking. A Cochrane review addressed the effects of ergonomic interventions in dentistry (Mulimani et al., 2018).

2. Ergonomic interventions for preventing musculoskeletal disorders in dental care practitioners (Mulimani et al., 2018)

2.1. What is the aim of this Cochrane review?

The aim of this Cochrane Review is to assess the effect of ergonomic

interventions for the prevention of work-related musculoskeletal disorders among dental care practitioners.

2.2. What was studied in the Cochrane review?

The population addressed in this review were adults, aged 18 years and older, who were engaged in the practice of dentistry (i.e. dentists, dental hygienists, dental auxiliaries, dental nurses or dental students). At least three quarters of the population included did not have musculoskeletal pain at baseline and had not sought active treatment for MSDs and those without central nervous system or inflammatory rheumatic diseases, degenerative muscular disorders, and acute traumatic events caused specifically by non-work-related factors. The interventions studied were physical ergonomic interventions (i.e. a multifaceted ergonomic intervention consisting of imparting knowledge and training about ergonomics, work station modification, training and surveying ergonomics at the work station, a regular exercise program, differently designed instruments used for scaling), cognitive ergonomic interventions, and organisational ergonomic interventions. The comparators were: no intervention, a sham ergonomic intervention, or any other alternative intervention. Primary outcomes studied were number of dental care practitioners with newly diagnosed WMSDs, self-reported complaints of pain attributed to MSDs, and work functioning or disability.

2.3. Search methodology and up-to-dateness of the Cochrane review?

The review authors searched for studies that had been published up to August 2018 without language or date restrictions, using the CENTRAL, MEDLINE PubMed, Embase, PsycINFO ProQuest, NIOSHTIC, NIOSHTIC-2, HSELINE, CISDOC (OSH-UPDATE), ClinicalTrials.gov,

DOI of original article: <https://doi.org/10.1016/j.msksp.2019.07.005>

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¹ This summary is based on a Cochrane Review previously published in the Cochrane Database of Systematic Reviews (2018), Issue 10. Art. No.: CD011261. DOI: 10.1002/14651858.CD011261.pub2 (see <http://www.cochranelibrary.com> for information). Cochrane Reviews are regularly updated as new evidence emerges and in response to feedback, and Cochrane Database of Systematic Reviews should be consulted for the most recent version of the review. The views expressed in the summary with commentary are those of the Cochrane Corner author and do not represent the Cochrane Library or Wiley.

<https://doi.org/10.1016/j.msksp.2019.102061>

Available online 14 September 2019

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and the World Health Organization International Clinical Trials Registry Platform) electronic databases.

2.4. What are the main results of the Cochrane review?

Two randomized controlled trials (RCTs) (one parallel arm and one cluster RCT) with a total of 212 participants were included in the review. The total sample size was reduced to 210 after adjusting for the design effect from clustering.

The review showed the following regarding different domains of ergonomic interventions:

Physical ergonomic interventions. Based on one study including 102 participants, there is very low-quality evidence that a multi-faceted ergonomic intervention has no clear effect on dentists' risk of WMSDs in the thighs (RR 0.57, 95% CI 0.23 to 1.42), or feet (RR 0.64, 95% CI 0.29 to 1.41) when compared to no intervention over a 6-month period. Based on one study including 110 participants, there is low-quality evidence of no clear difference in elbow (MD -0.14, 95% CI -0.39 to 0.11), or shoulder pain (MD -0.32, 95% CI -0.75 to 0.11) in participants who used light weight currettes with wider handles or heavier currettes with narrow handles for scaling over a 16-week period.

The evaluated studies did not measure the outcome of work functioning or disability.

Cognitive ergonomic interventions. No studies evaluating the effectiveness of cognitive ergonomic interventions were found.

Organisational ergonomic interventions. No studies evaluating the effectiveness of organisational ergonomic interventions were found.

2.5. How did the authors conclude on the evidence?

There is very low-quality evidence from one study showing that a multi-faceted ergonomic intervention has no clear effect on dentists' risk of WMSDs in the thighs or feet when compared to no intervention over a six-month period. Furthermore, there is low-quality evidence from one study showing no clear difference in elbow pain or shoulder pain in participants using differently designed instruments over a 16-week period. Based on these findings, the use of studied ergonomic interventions by dental care practitioners in their daily practice to prevent WMSDs can be neither refuted nor validated. The authors' ability to draw definitive conclusions is restricted by the paucity of suitable studies available and high risk of bias of the available studies.

3. What are the implications of the Cochrane evidence for practice in rehabilitation?

Due to the high susceptibility of dental care practitioners to occupational hazards like MSDs which may lead to poor quality of life, burnout, poor health and even to quitting the profession in some, it has been suggested that the use of ergonomic interventions such as making improvements in working style, instruments used, dental office designs, work environment, work posture, physical activity, mental stress levels, or scheduling of appointments may help to prevent WMSDs (Mulimani et al., 2018).

According to the results of the review, there is insufficient evidence to make definitive conclusions on whether physical ergonomic interventions are effective in preventing MSDs among dental care practitioners.

This review highlights the need for well-designed, conducted, and reported RCTs, with long-term follow-ups that assess prevention strategies for WMSDs among dental care practitioners.

Vocational/Occupational rehabilitation is a significant area in

rehabilitation (Chamberlain et al., 2009) and rehabilitation professionals may play an important role regarding the application of ergonomic interventions in a variety of WMSDs (Oral et al., 2013). Very low quality evidence of no clear effect on dentists' risk of WMSDs in lower extremities points to the uncertainty of the review authors on the estimate of effects when compared to no intervention. Low-quality evidence of no clear difference in elbow or shoulder pain when using relevant equipment with different weights and designs have implications that the true effect may be substantially different from the estimated effect with a high likelihood of the evidence to change in future research. The review authors (Mulimani et al., 2018) suggested that future studies need to include a large number of participants to have adequate power with stratified randomization to match the characteristics of the participants across intervention and control groups. Individual interventions rather than combined interventions and those including cognitive and organizational interventions need to be assessed with longer follow-up with comparators in the same domain and with objective outcome measures. From a rehabilitation perspective, an International Classification of Functioning, Disability, and Health (ICF) (World Health Organization, 2001) based model could well serve not only for the identification of problems in functioning including impairments in body functions, activity limitations and participation restrictions as well as barriers or facilitators in terms of environmental factors in vocational rehabilitation (Leyshon and Shaw, 2008), but also for research purposes to elucidate the effects of ergonomic interventions on specific functioning problems including environmental factors for the prevention of WMSDs.

Disclosures

The author declares no conflicts of interest.



Acknowledgements

The author thanks Cochrane Rehabilitation and Cochrane Work Group for reviewing the contents of the Cochrane Corner.

References

- Chamberlain, M.A., Fialka Moser, V., Schüldt Ekholm, K., O'Connor, R.J., Herceg, M., Ekholm, J., 2009. Vocational rehabilitation: an educational review. *J. Rehabil. Med.* 41 (11), 856–869.
- Hayes, M.J., Smith, D.R., Cockrell, D., 2010. An international review of musculoskeletal disorders in the dental hygiene profession. *Int. Dent. J.* 60, 343–352.
- Leyshon, R.T., Shaw, L.E., 2008. Using the ICF as a conceptual framework to guide ergonomic intervention in occupational rehabilitation. *Work* 31 (1), 47–61.
- Morse, T.F., Michalak-Turcotte, C., Atwood-Sanders, M., Warren, N., Peterson, D.R., Bruneau, H., et al., 2003. A pilot study of hand and arm musculoskeletal disorders in dental hygiene students. *J. Dent. Hyg.* 77 (3), 173–179.
- Mulimani, P., Hoe, V.C.W., Hayes, M.J., Idiculla, J.J., Abas, A.B.L., Karanth, L., 2018. Ergonomic interventions for preventing musculoskeletal disorders in dental care practitioners. *Cochrane Database Syst. Rev.*(10). <https://doi.org/10.1002/14651858.CD011261.pub2>. Art. No.: CD011261. <https://doi.org/10.1002/14651858.CD011261.pub2>.
- Oral, A., Ilieva, E.M., Küçükdeveci, A.A., Varela, E., Valero, R., Berteau, M., Christodoulou, N., UEMS-PRM Section Professional Practice Committee, 2013. Local soft tissue musculoskeletal disorders and injuries. The role of physical and rehabilitation medicine physicians. The European perspective based on the best evidence. A paper by the UEMS-PRM Section Professional Practice Committee. *Eur. J. Phys. Rehabil. Med.* 49 (5), 727–742.
- World Health Organization, 2001. The International Classification of Functioning, Disability and Health (ICF). WHO, Geneva.