October: Taking breaks – long hours on vibrating farm equipment

Kwaku Essien, S., Trask, C., Khan, M., Boden, C., & Bath, B. (2018). Association Between Whole-Body Vibration and Low-Back Disorders in Farmers: A Scoping Review. *Journal of agromedicine*, *23*(1), 105–120. https://doi.org/10.1080/1059924X.2017.1383333

Introduction: Low-back disorders (LBDs) are the most common musculoskeletal problem among farmers, with higher prevalence rates than in other occupations. Farmers who operate tractors and other types of machinery can have substantial exposure to whole-body vibration (WBV). Although there appears to be an association between LBDs and WBV, the causal relationship is not clear.
Objective: This scoping review investigates the association between WBV and LBDs specifically among farmers.
Methods: Nine databases were searched using groups of terms for two concepts: 'farming' and 'low back disorder'. Screening, data extraction, and quality assessment were performed by two reviewers independently. Included studies met the following criteria: focused on adult farmers/agricultural workers; assessed exposure to operating farm machinery such tractor, combine, or all-terrain vehicle; assessed LBDs as an outcome; and reported an inferential test to assess the relationship between WBV and LBD.
Results: After 276 full texts screened, 11 articles were found to analyze WBV as a risk factor for LBDs. Three were case-control, five cross-sectional, and three retrospective cohorts. Four studies showed no association between WBV and LBDs, four a positive association, and three results were mixed depending on the exposure/outcome measure.
Conclusion: A firm conclusion is difficult due to heterogeneity in, LBDs definition, type of farm commodity, study design, and statistical strategy. Direct comparisons and synthesis were not possible. Although retrospective cohort studies tended to show a relationship, future studies with a prospective cohort design could help clarify this association further.

Roggio, F., Vitale, E., Filetti, V., Rapisarda, V., Musumeci, G., & Romano, E. (2022). Ergonomic Evaluation of Young Agricultural Operators Using Handle Equipment Through Electromyography and Vibrations Analysis Between the Fingers. *Safety and health at work*, *13*(4), 440–447. https://doi.org/10.1016/j.shaw.2022.07.003

Background: Agricultural handle equipment is present on all production areas' farms. They are handy and portable; however, excessive use can lead to acute traumas or accidental injuries. Repetitive movements, awkward postures, and hand-arm vibrations predispose them to pain and work-related musculoskeletal disorders. The purpose of this study was to observe the interaction of handle equipment in terms of electromyographic activity and analyze the postural work-related alterations.
Materials and methods: Twenty male agricultural operators, mean age 24 ± 1.54 years, underwent the electromyographic analysis testing their muscular activities with a brushcutter, electric saw, and hedge trimmer in four different test conditions.
Results: The brushcutter proved to be the agricultural handle equipment with the higher mean frequency (3.37 ± 0.38 Hz) and root mean square (5.25 ± 1.24 ms-2). Furthermore, the digital postural analysis showed a general asymmetry of the main arm and the respective side of the

trunk. The head resulted right inclined in the anterior frontal plane by 5.7° ± 1.2°; the right scapula lower than the left in the posterior frontal plane (8.5° ± 1.8°), and a working trunk inclination of 34.15° ± 5.7°.
Conclusions: Vibrations of handle equipment and awkward working postures represent a risk for agricultural operators. Preventive measures are required to avoid young operators from experiencing musculoskeletal disorders all lifelong.

Essien, S. K., Bath, B., Koehncke, N., Trask, C., & Saskatchewan Farm Injury Cohort Study Team (2016). Association Between Farm Machinery Operation and Low Back Disorder in Farmers: A Retrospective Cohort Study. *Journal of occupational and environmental medicine*, *58*(6), e212–e217. https://doi.org/10.1097/JOM.0000000000000746
Objective: The association between whole body vibration (WBV) as measured by annual accumulated use of all-terrain vehicles (ATV)/combine/tractor operation and low back disorders (LBDs) among farmers was investigated.
Methods: Saskatchewan Farm Injury Cohort Study data was used. Baseline data were collected in 2007 on the three vehicle types and other factors. Follow-up data on LBD symptoms were collected during 2013 resulting in 1149 samples.
Results: Adjusted for age, education, and gender, LBDs were associated with tractor operation for 1 to 150 hours/year (Relative Risk [RR] = 1.23, 95%CI 1.05 to 1.44), 151 to 400 hours/year (RR = 1.32, 95%CI 114 to 1.54) and 401+ hours/year (RR = 1.34, 95%CI 1.15 to 1.56). Additionally, hip symptoms were associated with tractor operation. Only unadjusted associations were found in combine and ATV operation.
Conclusions: Duration of tractor operation and older age are important predictors of both low back and hip symptoms in farmers.