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Title
A screening tool to identify risks on musculoskeletal disorders for non-sedentary employees

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Summary
A tool to identify musculoskeletal disorders (MSD) of the lower extremities in non-sedentary employees is developed. The goal is to detect risks and complaints in an early stage to reduce the impact of the (developing) disorder by giving advice, e.g. changing work habits or starting insole therapy.

Introduction
Employees with non-sedentary professions have an increased risk of certain MSD. Due to prolonged standing, walking, weight lifting, and other physical demanding activities, physical complaints or even injuries can occur in the foot, ankle, knee, hip and back. These can result in an increased time of sick leave and a reduced satisfaction at work.

Certain factors can increase the overall risk of developing these MSD, e.g. personal characteristics (e.g. foot morphology, age), work related factors (e.g. function, number of steps taken during work) and psychological factors (e.g. work satisfaction, psychological stress level). When these risk factors are identified in time, the behavior or work environment of the employee can be adjusted. Treatment can be given when a disorder is in an early stage. As such, the further development of the disorder can be stopped. Therefore we developed a digital screening tool to examine the most important risk factors in non-sedentary employees.

Methods
The tool is set up in such a way that in a first phase, the employee can fill out a visual questionnaire containing questions on personal characteristics, work related questions and personal habits. In a second phase, the doctor or nurse performing the annual medical checkup fills out additional questions in the questionnaire which are related to the clinical status of the employee (such as measured weight, height, foot analysis, posture). As a result, the tool

will give the employee, when needed, recommendations to alter his behavior, or he will be forwarded to a foot expert who can provide him with custom made foot orthoses.

For developing the tool, first a meta-analysis of the existing literature was performed. Various studies in literature identify risk factors that can lead to MSD in employees working in various sectors. Odds ratios from this meta-analysis were used to obtain the most important risks, and calculate the estimated overall risk.

Results

At this moment, the screening tool is in a testing phase. It will be evaluated in three companies and for at least 400 employees. The impact of this tool will be evaluated by including a reduced version of the Nordic Musculoskeletal Questionnaire (NMQ), taking into account only the lower back region, hips/thighs, knees and ankles/feet.

The NMQ will be filled out during the screening, and at least six months after the recommendations are given to the employee. By comparing the status of the employee at both time instances, the clinical impact of the tool can be determined. Next to the clinical impact, also the the user experience of the screening tool will be evaluated. These results will be used to optimize the risk estimation algorithm.

Conclusion

A demo version of a tool for screening the risk of developing MSD for non-sedentary employees is developed. It will be unrolled in at least three companies to improve the user experience and optimize the risk estimation algorithm, and to evaluate the impact on the employees after at least six months.

This research is conducted within a research project, in which a close collaboration exists between the research group and partner companies, such as a company in the waste collection industry and an external prevention service company. If the outcome of tool is positive, it will be implemented in the medical screening for certain groups of employees in the future.

References
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