

Can corrective and prismatic lenses in combination with ergonomic information, reduce musculoskeletal disorders of the neck of dentists / dental hygienists?

Background

Numerous scientific studies conducted both in Sweden and around the world have shown that dentists and dental hygienists are especially vulnerable to work-related symptoms from muscles and joints, especially in the neck and shoulders. The severity of these symptoms varies, but to have neck pain at least one or more times per week part, is rather the rule than the exception in these professions. Some studies have shown that as many as 60-70% of all dentists are experiencing pain from the neck and shoulders, due to factors at work, and particularly long lasting exposure to poor working postures and stress. Despite that employers, dentists and dental hygienists are aware of these facts, there have been surprisingly few interventions, evaluating the effects of interventions aimed to reduce the risks of musculoskeletal disorders for these professionals. It is a well-established fact that there is a link between poor ergonomics (both physical and psychosocial) and muscular pain. These symptoms often lead to reduced workability and ultimately long-term sick leave with high costs for the individual, organizations and for the society.

As a consequence of this knowledge the administration for the public dental clinics in the Västra Götaland region in February 2009 took the decision to test and assess the impact of the so-called Optergo Solution concept. This decision led to that a number of dentists and dental hygienists, scattered in various clinics throughout the region of Västra Götaland, had the opportunity to examine if corrective glasses in combination, prismatic lenses (individually tailored) and ergonomic information could reduce the exposure to the extreme forward bending in the neck. At the same time it was also decided that possible positive effects of Optergo-Solution concept should create the base for future recommendations.

Method and Implementation

A project team consisting of representatives from the dental care management, wellness department within the dental organization in the region, occupational health services (Health & Working life), the Institute of Stress Medicine and the Optergo AB was formed. A questionnaire was sent out to about 450 dentists / dental hygienists in the region. The response rate was high, 283 people (71%) submitted completed questionnaires. From this group 60 dentists /dental hygienists were picked out and offered to participate in the study. Of these 60 subjects, 15 individuals declined to participate in the study were due to various reasons,.

At the start of the study 45 individuals (30 dentists and 15 dental hygienists) were included in study group. All 45 individuals underwent a comprehensive 1.5-hour basic ergonomic training with focusing on working postures and working technique. Baseline assessments were made including measurement of neck and arm positions and movement velocities with so-called inclinometers (technical measurement). Ratings of perceived exertion and comfort during clinical work in all quadrants of the oral cavity were also measured. All measurements took place at the subject's ordinary work and the work performed was done on "real" patients. The subjects were randomly assigned to either the intervention group or the control group.

The dentist / dental hygienist who was assigned to the intervention group was sent to the optician for optometric correction and test of the individually manufactured glasses with prismatic lenses, and was instructed to work in an optimal working posture and to use such a favorable working techniques as possible. The optician who performed this task had previously received ergonomic training from a specialist and belonged to Optergos so-called "knowledge-centers" that are scattered in different locations in Sweden and also in many places in Europe. The purpose of these "centers" is to ensure that information regarding both the optical and ergonomic advice is consistent with Optergo Solutions

concept.

Recipes for the personalized glasses were subsequently sent to Optergo AB for production. In average, it took approximately four weeks after the baseline assessments were performed until the glasses were sent to the dentist / dental hygienist.

Partly because of the unique collaboration between researchers, practitioners, suppliers and customers, this part of the project, despite numerous logistical problems, could be performed in a smooth way.

After an average of eight weeks of use of the glasses for the intervention group and about 8 weeks after the completion of ergonomics info follow up assessments were made. The aim was to explore whether there were any difference between the two groups with respect to neck angles, movement speed, perceived exertion and comfort, moreover to look at changes in each group over time.

Results

The analysis of data showed that the intervention group reduced their neck angle significantly more than the control group. Thus, the intervention was able to improved neck flexion during work in the oral cavity. The control group also reduced their neck angle, indicating at also ergonomic information specifically designed for dentistry professionals reduced exposure to adverse and tiring postures associated with clinical dentistry work.

The operating speed decreases for both groups. This could indicate that the range of motion in the neck, is a little more static, but not to such an extent that this could be considered as an increased risk. Results from a follow-up survey approximately 6 months after the intervention showed that 19 out of 24 dentists / dental hygienists had continued to use their glasses regularly in all types of clinical work and that most of the dentists/dental hygienists are satisfied or very satisfied with the glasses and the ergonomic information. As for perceived exertion and comfort during work, there were no significant difference between the two groups, both groups reduced their perceived exertion over time. The intervention group, however, the reduction was more pronounced.

Conclusion

It is likely that corrective and individually tailored prismatic lenses can reduce the risk of neck and upper extremity symptoms among of dentists / dental hygienists. Parts of the effect can be attributed to the ergonomic information and the optometric correction given to the intervention group. In addition, the compliance with using the glasses was very high. Ratings of perceived exertion were also reduced more in the intervention group then in the control group. Hence, the Optergo Solution concept might be a effective to reduce musculoskeletal disorders of the neck associated with dental work especially for dentists / dental hygienists who are used to wear glasses, or are about to need binocular loupes when performing work in the oral cavity.

The decrease in movement velocity resulting in more static postures could effectively be reduced by using the custom-break programs with exercises for the neck and shoulders available through Optergo Solutions concept.