

Assessment of exposure of dental hygienists to musculo-skeletal overload during implementation of their occupational activities.

Abstract

Performing the duties of an oral hygienist may contribute to the emergence of musculo-skeletal ailments. These disorders are a consequence of an overload resulting from the specific type of occupational activities performed in a forced body position. They tend to be located in the neck, arms, wrists, upper and lower spine, ribs, knees and feet. The consequences of muscle and osteoarticular disorders include pain in a specific region, the emergence of osteoligamentous degeneration, intervertebral discs deformities, damage to intervertebral joints, and other complexes like carpal or cubitus canal isthmus, omalgia and others. Spinal overload may contribute to the emergence of static-dynamic balance disorders.

When occupational activities are performed one should maintain a posture based on the principles of ergonomics, which restricts the risk of musculo-skeletal disorders. A dental hygienist, irrespective of the type of activities being performed or the patient's position on the dental chair, should try to work in the upright position. A properly equipped surgery, and maintaining an optimal working environment through proper arrangement of instruments and equipment, is an additional contributing factor.

The aim of this study was to assess the extent of dental hygienists' exposure to musculo-skeletal overloads while performing their vocational duties.

To meet this target, an analysis of selected risk factors contributing to musculo-skeletal pathosis was performed:

- position of specific parts of the body (the neck, the trunk, the upper and lower extremities (the arm, forearm and the wrist)) that is being adopted when activities are performed
- subjective determination of the force used on a 4-grade scale,
- the way dental instruments are held,
- static exertion when dental procedures are performed,
- monotony and monotypy at the workstation.

The study covered 272 professionally active hygienists and behavioral factors related to the duration of work experience and to the timetable were determined.

Between 2013/14, studies were conducted in the Mazovian Province which covered 188 professionally active hygienists aged between 23 and 52 years, with work experience between < 5 and ≥ 20 years. Most respondents declared that their weekly schedule was 30-40 hours (73.6%), for 17.8% approximately 20 hours, for 4.3% – up to 15 hours, and the remaining 4.3% reported working for longer than 60 hours.

The second stage of the study conducted in 2018 year covered 84 professionals, with work experience of 5 to ≥ 20 years. The majority of respondents declared that their weekly schedule was 30-40 hours (40.5%), for 28.6% approximately 20 hours, and for 30.9% – between 40 - 60 hours.

Unfavorable inclination of the neck ($>20^\circ$) occurred in 48.5% of the examined individuals, twisting in 80.5%, and 37.5% declared both types of overload. Only 10.3% subjects indicated absence of overload in the neck area. Additionally, 14.3% subjects can perform their duties without having to bend their trunk, in 53.7% trunk angulation does not exceed 20° , 28.3% reported angulation in the 20° - 60° range, and 3.7% $\geq 60^\circ$. As many as 78.3% admitted that they additionally rotated their trunk when working. Loading of knees was not reported by 22.8%, 62.9% experienced slight loading and 14.3% knee flexure $> 60^\circ$. Overload associated with raising the right arm was reported by 92.3% of the respondents (slight – 7.0%, 20° - 45° – 45.6%, 45° - 90° - 39.7%). As for the left arm, 7.7% of the respondents indicated slight inclination, 41.6% – 20° - 45° range, and 43.0% $< 90^\circ$. Additional load associated with raising the shoulder joint or lateral abduction of the arm was reported by 71.3% and 66.2% respondents for the right and the left arm, respectively. The unfavourable position of the right forearm was indicated by 41.9% of the respondents, 44.5% the left forearm. Others experienced only slight forearm load. The unfavourable position of the right and left wrist was observed by 35.3% and 39.6%, respectively. Additional rotation and lateral inclination of the wrists was reported by 79.0% and 76.8 % of the respondents for the right and the left wrist, respectively. The application of force to lift and/or carry extra weight did not concern 52.2% of the respondents; the others (43.8%) ticked weights in the range of 10 to 20 pounds, and mere 4.0% reported weights in excess of 20 pounds. Good grip of objects with the right hand was confirmed in 77.6% of the investigated participants, acceptable in 19.8%, in 2.2% as poor, and in 0.4% as unacceptable.

Static exertion persisting for longer than 1 minute was reported by 18.8% of the participants; 74.3% would repeat the same activity four times a minute or more often, 6.2% make rapid and considerable postural changes and 0.7% did not indicate any related loads.

The analysis of the obtained results indicates that 0.7% of respondents have a negligible risk to develop Rapid Entire Body Assessment; in 5.5% the risk is small, average in 33.1%, high in 49.3%, and in 11.4% very high.

The obtained results confirm a high-risk level of exposure of dental hygienists to musculo-skeletal overload (the neck, the trunk, the upper and lower extremities (the arm, forearm and the wrist)). They also indicate significant lack of awareness regarding work ergonomics such as the way force is used or instruments grasped, and static exertion in this profession. The level of exposure to musculo-skeletal ailments is an indicator of an urgent need to implement preventive measures, revise curricula for undergraduate courses in the scope of dental hygiene. It is also necessary to perform periodic check-ups. On the basis of the study it was possible to draw the following conclusions:

1. An overwhelming majority of dental hygienists reported unfavourable positions of specific parts of their bodies (neck, trunk, lower and upper extremities (arms, forearms and wrists)) when working.
2. Almost half of the respondents were exposed to loads or sudden exertion of medium intensity associated with lifting extra weights.
3. An overwhelming majority of respondents self-assessed the quality of their grip of instruments as good or acceptable.
4. In the surveyed group of dental hygienists, monotony and monotony have been identified as factors contributing to mental burden. During certain activities the duration of the aforementioned loads lasted longer than 20 minutes.
5. High risk of exposure to musculo-skeletal complications calls for an urgent need to implement rehabilitative, educational and preventive programmes for dental hygienists to address the issue of work ergonomics.