**Ergonomics and Periodontal Instruments** (10/06)


Dentists and dental hygienists are at risk of developing work-related musculoskeletal disorders (MSDs) compared with individuals in other occupations. An important risk factor in dental practice is forceful pinching, which occurs during dental scaling. Ergonomically designed dental instruments may help reduce the prevalence of MSDs among dental practitioners. In this study, 24 dentists and dental hygienists used 10 custom-designed dental scaling instruments with different handle diameters and weights to perform a simulated scaling task. The authors recorded the muscle activity of two extensors and two flexors in the forearm with electromyography, while thumb pinch force was measured by pressure sensors. Handle designs of periodontal instruments had significant (P < .05) effects on hand muscle load and pinch force during a manual-scaling task. The instrument with a large diameter (10 millimeters) and a light weight (15 grams) required the least amount of muscle load and pinch force. There was a limit to the effect of handle diameter, with diameters larger than 10 mm having no additional benefit; however, the study did not identify a limit to the effect of reducing the weight of the instrument, and therefore instruments lighter than 15 grams may require even less pinch force. **The results from this study can guide dentists and dental hygienists in selection of dental scaling instruments.**

**DECS Comment:** Forceful hand exertions such as grasping small instruments for prolonged periods, forceful squeezing/release of instruments and repetitive movements are common during scaling procedures and are potential contributing factors for work-related MSDs. A risk factor is not always a causation factor. The level of risk depends on the length of time a worker is exposed to these conditions, how often they are exposed, and the level of exposure. Usually a combination of multiple risk factors (vs. a single factor) contributes to or causes a MSD. Also, it is important to note that not everyone exposed to any or all of the risk factors will develop a MSD. Individuals do not respond to risk factors in the same way and predisposing factors such as age, arthritis, renal disease, hormonal imbalances, diabetes, and hypothyroidism may play a role. This was a laboratory-based study that limited scaling to one tooth. The muscle load and pinch force may be different when scaling on a real patient; however the study showed that the high level of pinch force required for scaling can be reduced by selecting instruments with a large diameter and a light weight. The authors also remind us that in addition to instrument design, careful scheduling of patients with heavy calculus, taking appropriate breaks, and ensuring that instruments are kept sharp are also important factors in preventing and reducing illness and injury.