

feel the
difference



Anne Pelkonen
Sanoittamo Oy

The value of an ergonomic instrument grip

Choosing the most ergonomic hand instrument can make a big difference in terms of discomforts and disorders when performing dental work. It is by no means insignificant what the diameter of the hand instrument's handle is or what the material of the grip surface is. When holding the instruments for approximately 2,000 hours each year, the design, weight and feel of the instrument are crucial for the dental practitioner in terms of his/her performance and productivity. Choosing a silicone handle with a large diameter is the best solution, as discovered in several studies.

According to recent studies on dental ergonomics, as many as two thirds of dentists suffer from back, neck, shoulder, arm and hand complaints to some extent. Working in an unergonomic posture with limited amount of movement and performing repetitive gestures strains the healthy and well-balanced functioning of the upper limbs, hands, muscles and joints.

Musculoskeletal discomforts are the most common problems in clinical dental work. These problems are made worse by measures and movements that require uncompromising accuracy and concentration and this causes muscle tension.

Many of the discomforts and disorders can be prevented by good ergonomics. Hand instruments and handling of the instruments constitute an important part of this.

Emphasis on ergonomics

A great deal can be done to improve dental work ergonomics. It is a well-known fact that good ergonomics increase job motivation, decrease absences due to health problems, enhance productivity and lead to better overall quality of life. Today the focus is on ergonomics.

In the article “The effects of periodontal curette handle weight and diameter on arm pain” (1), the researchers conducted a four-month, randomized, controlled trial to evaluate the effects of curette handle diameter and weight on arm pain among dental hygienists and dentists. The primary outcomes tested included change in mean pain score in the right wrist, elbow and shoulder from the month before the intervention to the last month of the study after the important covariates were adjusted. The 110 participants worked at 90 dental offices.

The results leave no doubts as far as the hand instruments’ most crucial ergonomic characteristics are concerned.

A well chosen instrument reduces pain

The study results show that dental instrument design has an effect on upper extremity pain. Using a lighter instrument with a wider diameter reduces and prevents upper extremity pain associated with dental hygiene procedures. The study results reveal that the unadjusted pain scores improved more for participants who used an instrument with a light handle and wide diameter (14 g with curette tips, handle diameter: 11 mm) than those who used a heavy-handled instrument with a narrow diameter (34 g, handle diameter: 8 mm) for the three upper extremity regions.

For the secondary outcomes, both the number of nights that the practitioners awoke with finger numbness and the number of days that pain medication was used improved more for participants assigned to the lightweight instrument with the wide diameter than they did for those assigned to the heavy instrument with the narrow diameter.

The online exit survey ratings for instrument diameter, weight, shape and productivity were also more positive for participants who used the lightweight instrument with the wide diameter. The results of the study show that replacing periodontal instruments with handles that are lighter and wider in diameter (11 mm) than a typical handle is a low-cost intervention that results in a modest reduction in arm pain among dental practitioners.

Material and pattern increase usability

In another study, “Evaluation of Ergonomics and Efficacy of Instruments in Dentistry” (2), five different models of Gracey finishing curettes used for scaling and root planing were evaluated to determine their ergonomics and efficacy. The focus was on usability, muscle strain, muscle activity, postures of upper limbs and work productivity. The two most usable instruments according to the participants’ perceived assessments were those with the thickest silicone handles (14.2 mm and 11.7 mm). The participants reported that the instruments with the thickest and second thickest silicone handles caused the lowest strain, both for the fingers and palm and for the thumb. Work productivity was also improved using the thicker-handled instrument.



Photo: Ergonomic test of different instruments with simulated work situation on a phantom head.

This study shows that the design and material of dental instruments handles is important from an ergonomics and productivity point of view. The use of instruments with thick (diameter: 12-14 mm) silicone handles were found to be more usable and cause lower perceived musculoskeletal strain. In addition, the use of these instruments was more productive than the use of instruments with thinner handles in a scaling task. As this study shows, the material and the surface patterning of the handle are acknowledged as important factors that affect the usability of the instrument.

The American Dental Association, ADA, has also paid attention to the hand pain experienced by dentists. ADA states that performing dental procedures using finger, thumb or wrist muscles frequently or for prolonged periods of time can lead to or aggravate conditions that cause hand pain. According to ADA, the risk of hand pain can be prevented by using larger diameter instruments. ADA also advises reducing the force on hands and fingers and the torque of hands by using hand instruments and powered tools that are lighter in weight, balanced and well sharpened. Therefore, using the most ergonomic hand instruments seems to be critical.

Decisive experiences

Dental hygiene practice has clearly shifted toward an increased focus on ergonomics. Dental professionals prefer ergonomic, silicone-handled hand instruments that combine a comfortable grip with high tactile sensitivity and require minimal force. There is a very good reason for this: enhancing ergonomics increases productivity and long-term capacity for work.

You can feel the difference between a regular and ergonomically-advanced hand instrument, as they say at LM-Dental. The company is a true world-class pioneer in offering all the aforementioned qualities. The ergonomic design, non-slip grip, long lasting sharpness and tactile sensitivity of the instruments has been noticed and found effective all around the world. LM-Dental's pivotal product theses of a thicker handle, optimised shape, elastic surface, lightness and colour coding has become the industrial standard for which there is no need to compromise on. Ergonomics has been the company's guiding light for almost 40 years.

One example of the ergonomics is LM-Dental's ErgoMax Gracey, which is classified as the best product of 2013 by Dental Product Review. (3) The instrument was evaluated by 13 dentists with a total of 332 years of experience. LM-ErgoMax Gracey received a convincing overall rating of 4.5 (out of a maximum of 5.0). Tactile feeling and sensitivity, handle weight and size, ergonomics and blade sharpness and durability were all thought highly of. For instance, an evaluator with 11 years of experience said that:



Photo: An ergonomic instrument with a silicone handle and optimal design.

“

The soft handle reduces overall fatigue and the blades hold their edge well. Another stated that “The handle weight is extremely light” and an evaluator with 12 years in practice added, “They are very easy to work with. Not having to look for the right instrument saves a lot of time.

”

What is, however, even more relevant is the fact that the qualities and requirements of ergonomically good quality instruments have also been unraveled in several scientific studies.

(1) Tandlægebladet 2013:117, 6; 466-473)

(2) N. Nevala-E. Sormunen-J. Remes-K. Suomalainen (The Ergonomics Open Journal, 2013, 6:6-12)

(3) <http://www.dentalproductshopper.com/lm-ergomax-graceys>