

A Better Way to Scale?

In comparison with people in other occupations, Dental Professionals are at increased risk of developing work related musculoskeletal disorders (MSD), including carpal tunnel syndrome (CTS). These problems are developed due to a number of factors, some of which can be traced to methods of practice taught as undergraduates. Some however can be attributed to acquired bad practice, and to poor selection of instruments.

Anton et al (2002) found that at least one MSD was reported by 93% and CTS was 42% if defined by symptoms alone, however this figure reduces to 8.4% if combined with Nerve Conduction Studies. Significant factors associated with CTS include Age, BMI, and number of patients treated per day.

Instrument design has a large part to play in the reduction of CTS, which can be due in part to the technique we use to grip an instrument, known as forceful pinching..

The force used to grip the instrument can depend on a number of factors, experience, diameter of instrument, material of handle, sharpness of instrument and technique used.

Inexperienced practitioners tend to grip an instrument tighter than an experienced one as they are unsure how much grip is needed to secure the instrument to carry out the task (Dong et al 2007).

Studies have explored the optimal diameter of the instrument handle and have concluded that 10 mm diameter produces the greatest benefit (Dong et al 2006), any larger than this did not seem to produce any additional benefit. The weight of the instrument also has an effect on the load, with a lightweight instrument (15g) requiring less pinch force. Another study has shown that the pinch force may be reduced by increasing the friction between the instrument and the gloved hand. The greatest friction was achieved by the use of nitrile gloves and a Delrin (Resin) surface that is knurled (Laroche et al 2007).

The use of blunt instruments radically increases the pinch force required and usually goes un-noticed by the practitioner as the blunting happens over a period of time or due to a central sterilisation, instruments are circulated between surgery's and so there

is a lack of ownership. This leads to the practitioner not caring for their own instrument and thus a blunt instrument with the increased pinch force is used increasing the risk of CTS.

However even when we optimise these factors and reduce the amount of pinch force used in controlling the use of the instrument the greatest reduction may be achieved by altering our technique. In Dental School the technique taught (certainly in my day) was that of a pull technique, this involves holding the instrument between thumb and forefinger and using the middle finger as the guide. You were expected to pull the instrument in a vertical direction along the long axis of the tooth, this necessitates the placement of the third finger as close to the tooth as possible. All movement is achieved by pinching the instrument and contracting the thumb and forefinger so that all the movement is concentrated in the small joints of the fingers, this causes a repetitive strain on the joint and the tendons in the hand.



Figure 1 from http://www.bosmc.com.au/patienteducation_handupperlimb.htm

Since leaving Dental School (1980) I have used another technique and when you consider that I only hand scale, I have never had any problems. This technique

involves the use of the larger joints which have more surface area to spread the load. By using the leverage naturally present we can apply the force necessary to remove the calculus without tiring the muscles or placing a strain on the tendons. Holding the instrument in a pen grip between the thumb and the first and second finger, the third finger is used as a rest and a fulcrum (Fig. 2).

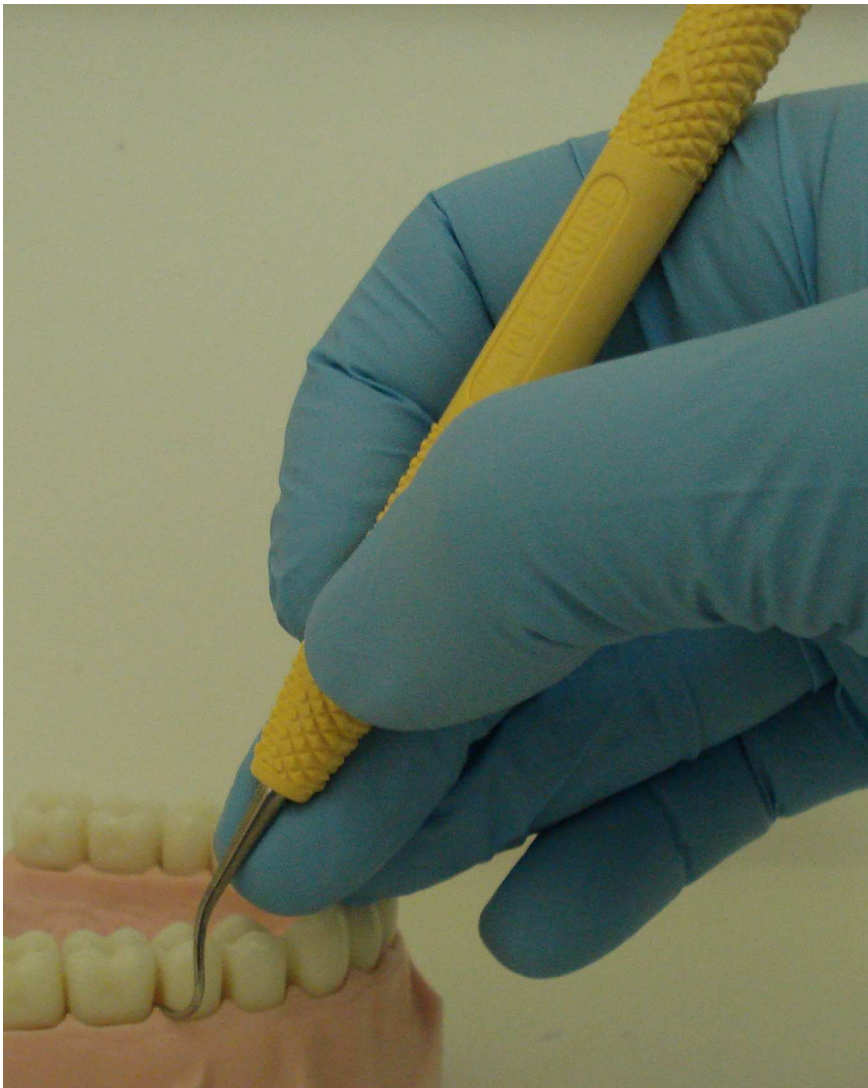


Figure 2: Finger Position

By holding the instrument between the thumb and the first and second finger we create a triangle and increase the gripping surface area by 50% and reduce the pinch force required. Movement of the instrument is achieved by rotation of the lower arm and hand about the fulcrum, thus moving the instrument without using the small joints of the fingers or the associated tendons.

Manufacturers of instruments have a large part to play in the reduction of CTS. By designing instruments to take into account the current research, they can dramatically reduce CTS. One such company to do so has been PDT (Paradise Dental Technologies Inc), their designs have taken on board the research and have developed instruments which stay sharp longer, have larger diameter handles made of resin, and are knurled and light. They have even developed a totally new range of instruments that have been designed by a hygienist.



The O'Hehir (named after the designer Tricia O'Hehir) has been designed to reach all surfaces and can be used in all directions, with a cutting edge which reaches into the base of a pocket. The working part of the instrument is shaped like an excavator but the working surface is spooned, thus providing a cutting edge 310 degrees around the circumference. This also allows it to be used in any direction, so increasing its versatility. Since first using these instruments I have found them to be invaluable in my periodontal armament, their colour coding helps in instant recognition saving me time in searching for the right instrument.

In conclusion, my recommendations to reduce CTS and MSD are:

- ✚ Select your instruments well (look at the design)
- ✚ Look after your instruments (keep them sharp)
- ✚ Review your technique

Although not covered here, I would also suggest all Hygienists get themselves a pair of loupes, they will improve your posture and reduce the incidence of MSD.

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Biography

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John is a hands-on Dental Hygienist working in private practice in Cheshire with 28 years of experience. A member of the DCP advisory board, FGDP(RCS), on the editorial board of Team in Practice as well as spoken at a number of national meetings. John hosts and moderates a forum website for Hygienists (www.hygienist.co.uk), he has an MSc in E-Learning Technology (UOP), a Diploma in Computing (Oxford) and runs a web design and hosting consultancy specialising in E-Learning.

