No turning back: posture in dental practice

By **Martin Breslin**¹ and **Shelley Cook**²

PHYSICAL STRAIN

Anyone who has worked in dentistry will be aware that it can be an emotionally and mentally challenging profession at times.

However, one area that is often overlooked is the physical strain that can be placed on our bodies. In our careers as a dentist and a dental therapist we have both experienced back and shoulder pains and have come across many colleagues (both dentists and dental care professionals [DCPs]) who have also suffered with similar problems. This can result in discomfort while working leading to numerous problems including inability to perform certain tasks and an inevitable need to take time off work. Two of our colleagues have even had to undergo surgery relating to poor working posture.

There is a wealth of evidence in the dental literature which highlights the potential physical strains of practising dentistry. Research by Brown *et al.* in 2010¹ looked into reasons for early retirement due to ill health among dentists. Of 189 dentists questioned, the most common cause of ill health

retirement was musculoskeletal disorders. A similar situation is seen with dental nurses² and hygienists and therapists alike.³

This article will give a brief overview of methods for preventing/controlling back problems and improving posture with particular relevance to the dental professional.

HOW CAN WE MANAGE MUSCULOSKELETAL DISORDERS? Posture

Prior to the 1950s it was common for the dental chair to be in an upright position with the clinician standing up throughout treatment.⁴ However, with the ever-increasing precision and complexity involved in dentistry along with an increase in patient expectation, procedures are taking longer and the operator commonly treats patients in a seated position for the majority of operative procedures. In order to obtain adequate vision and access for periodontal and restorative treatments, operators and dental nurses may be inclined to twist their necks and backs (Fig. 1).

Incorrect working posture is the major cause of musculoskeletal problems in dentistry.⁶ Ellis Paul has written extensively on the subject of posture in dentistry.^{5,6} The following information on correct working posture is based on work carried out by Ellis Paul who pioneered much of the research in this area and 'close support dentistry'. Readers should consult the references for further information.

Correct patient position

The patient chair should be completely flat to keep the patient completely horizontal^{5,6} (Fig. 2). This is an absolutely essential part of working in the correct posture which is often overlooked. In the authors' experience some patients may express a dislike of the sensation of the dental chair moving back into this horizontal position. One way of combatting this may be to have the chair in the horizontal position before the patient sits in the chair, much like how a patient may mount the bed in hospital or when visiting a general practitioner.⁵

Fig. 1 Here both the operator and dental nurse are adopting a bad posture. They are both bending and twisting their backs to gain a better view of the mouth. The dental nurse's right arm is also raised causing additional stress

Fig. 2 Here the patient is sat completely horizontal and the operator and dental nurse are adopting a good posture. Note also how the dental nurse's eye level is above that of the operator's

It is important to note that some medical conditions may preclude a patient from being completely horizontal such as pregnant patients, those with hypertension or spinal problems.

The vertical height should be adjusted so that the operator has good vision of the patient's mouth without having to bend too far forward. This is usually at the operator's mid sternal (or heart) level (Table 1).

¹Martin Breslin is an associate dentist in general practice; ²Shelley Cook is a dental therapist in a mixed private and NHS practice.

Figs 3a-b Comparison of bad posture vs. good posture when treating the upper right buccal surface. The operator is bending her back (and also raising her left arm) to get good vision in the 'bad posture'. In order to improve posture, the patient has turned her head to the left and the operator has moved slightly round the dental chair to the 11 o'clock position. The operator now has good vision of the upper right quadrant without having to bend her back

Figs 4a-b Comparison of dental nurse posture: bad posture vs. good posture. In the bad posture example the dental nurse's knees are pointing straight towards the patient. This can lead to 'leaning over' slightly to get good vision of the mouth. In the good posture example, the dental nurse is sat at a slight angle to the patient which naturally brings her closer to the patient and allows good posture to be maintained

Table 1 Correct posture for the operator^{5,6}

- ✓ The operator should sit as close as possible to the patient to avoid having to bend the back too much
- ✓ Both feet should be on the ground
- ✓ The upper border of the thighs should be slightly bent
- ✓ The long axis of the torso should be vertical (ie the back should be straight!)
- ✓ Both shoulders should be horizontal (not raised)
- ✓ Both arms should be in light contact with the rib cage

All efforts should be made to maintain this posture throughout treatment. In order to achieve this, the operator will have to make some adjustments. A good habit to get into is to ask the patient to move their head so you don't have to. For example, when working on the buccal surface of the UR6, ask the patient to tilt their head to the left, rather than moving your head uncomfortably to your right. You may also have to move slightly around the dental chair (Fig. 3).

Correct posture for the dental nurse

Feedback from nursing staff suggests that often operators easily forget about the dental nurse's posture. It is essential that the dental nurse

avoids repeatedly changing posture by twisting and leaning over as this repeated strain will lead to musculoskeletal problems.⁵ Table 2 identifies the key areas and Figure 4 shows a comparison of bad *versus* good posture for the dental nurse.

Dental nurse should sit higher than the operator

This allows the dental nurse to gain good vision of the oral cavity by seeing over the operator's hands (Fig. 2). In our experience many dental nurses sit at the same height as the operator. This can cause back strain, as in order to reach the patient's mouth the dental nurse has to lean across the patient's body and

Table 2 Correct posture for the dental nurse^{5,6}

- ✓ The dental nurse should sit higher than the operator
- ✓ Sit 'at an angle' to the patient
- ✓ Move your arms not your back

inevitably bend their back.

By sitting higher up, the dental nurse has good vision of the patient's mouth without having to lean forward, allowing them to keep their back straight. As a general rule, the dental nurse's eye level should be approximately 10 cm higher than the operator's.^{5,6}

Sit 'at an angle' to the patient

By sitting at 45 degrees to the long axis of the patient, the dental nurse can gain access to the oral cavity without having to lean forward (Fig. 4).

Move your arms not your back

There should be no need to lean forward and bend the back to reach the oral cavity. By following the main concepts mentioned above, the dental nurse should be able to maintain a straight back. Hand and arm movement should be all that is needed. Figure 5 shows the dental nurse sitting too far away from the patient.

Four handed/close support dentistry

Four handed or close support dentistry involves the operator and dental nurse working as efficiently as possible whilst both maintaining correct posture. Essentially the dental nurse carries out as many non-operative tasks as possible while the patient is undergoing treatment.⁶ In its purest form, all the instruments are kept on the dental nurse's

'The dental nurse's eye level should be approximately 10 cm higher than the operator's.'

Fig. 5 Here the dental nurse is sat too far away from the patient causing her to bend her back to reach the patient

Fig. 6 Please don't work like this!

side who then passes them to the operator when they are needed. In theory the operator should not need to move their eyes from the patient's mouth, avoiding having to bend and twist to reach instruments. With practice the dental nurse should be able to anticipate which instruments are needed in the correct order so that treatment can proceed without any interruptions. This should enable treatment to proceed as efficiently as possible.

As well as being actively involved in instrument exchange the dental nurse also plays a big role in ensuring the operator has good vision by retracting tissues and aspirating. Not only does this improve the efficiency of treatment but it also promotes good posture in both the operator and the dental nurse.

A good dental nurse will be highly motivated and organised to ensure this works efficiently. All instruments for a procedure should be laid out on the dental nurse's side to avoid having to break away to look through drawers or go to the central storage area mid-treatment for a forgotten instrument. Apart from avoiding the interruption of treatment this will ensure the dental nurse maintains good posture by avoiding twisting and turning to reach the instrument. In our experience most dental nurses prefer this way of working as they are more involved in the patient's care. However, this can only work well with lots of practice so that the operator and nurse build up a good understanding.

There are numerous hands-on courses available that teach four handed dentistry and we would highly recommend attending one to gain a better understanding of this subject. These are particularly useful when dental nurses and operators attend them together.

Operating stool

In recent years numerous manufacturers have developed operating stools which are designed to improve working posture. The manufacturers of the Bambach Saddle

Seat claim that it can alleviate many of the problems associated with muscle fatigue by ensuring that the natural 'S' shape curve of the spine is maintained.

A study conducted at the University of Birmingham found that posture was significantly better in dental students using a Bambach Saddle Seat compared with a 'regular' seat.⁷ However, some commentators on the subject, notably Ellis Paul, have expressed concerns with these saddle chairs. The saddle chair causes the operator to sit slightly higher up and their thighs to splay outwards. This may prevent the dental nurse from sitting close enough to the patient (as the operator's thighs get in the way) and from sitting high up enough. Both of these factors could force the dental nurse to lean forward and bend their back to gain access to the oral cavity.⁸

Magnifying loupes

These are optical systems worn by the operator which magnify the image of the patient's teeth. As well as the obvious benefits of improved vision of the oral cavity they can also help to promote good posture by being set up so that they only give a clear image when the operator has an upright posture.⁹ For instance the operator position adopted in Figure 3's example of bad posture would not be possible as at this proximity to the patient the operator's vision would be 'blurred'.

Regular exercise

The benefits of regular exercise have been well documented for many years. As dentistry is a sedentary profession it is particularly important that dental professionals take regular exercise. Apart from the obvious health benefits, regular exercise helps to maintain mobility and flexibility of the joints of the body.⁶ Activities such as swimming and Pilates or yoga have been found to be particularly helpful as they can improve flexibility and strengthen back muscles.¹⁰

Surgery design

One final important point which should be mentioned is that poorly designed surgeries with inadequate space may hamper efforts to maintain good working posture. However, if the dental team are organised and plan ahead it is possible to overcome most problems.

Conclusion

It is essential that all members of the dental team are aware of the importance of taking steps to avoid musculoskeletal problems. With the average age of retirement continuing to rise, avoiding musculoskeletal problems in dentistry is likely to be more important than ever.

A final note - please don't work in the positions shown in Figure 6!

Thank you to staff at Stepping Stones Family Dental Health Centre, Ludlow for the photographs.

1. Brown J, Burke F J, Macdonald E B *et al.* Dental practitioners and ill health retirement: causes, outcomes and re-employment. *Br Dent J* 2010; **209**: E7.
2. Crawford J O, Shafrir A, Graveling R, Dixon K, Cowie H. 2009. A systematic review of the health of health practitioners. Edinburgh: Institute of Occupational Medicine, 2009. Available at: http://academia.edu/271181/A_systematic_review_of_the_health_of_health_practitioners (accessed 3 July 2013).
3. Hayes M, Cockrell D, Smith D R. A systematic review of musculoskeletal disorders among dental professionals. *Int J Dent Hyg* 2009; **7**: 159-165.
4. Parker M. The Compleat 1950s dentist. *BDA News* February 2013; 20.
5. Ellis P. *Team dentistry – chairside procedures and practice management*. London: Dunitz, 1991.
6. British Dental Association. Occupational back pain – Factsheet. 2010.
7. Gandavadi A, Ramsay J R, Burke F J. Assessment of dental student posture in two seating conditions using RULA methodology – a pilot study. *Br Dent J* 2007; **203**: 601-605.
8. Paul E. Posture technique. *Br Dent J* 2008; **204**: 169-170.
9. James T, Gilmour A S. Magnifying loupes in modern dental practice: an update. *Dent Update* 2010; **37**: 633-636.
10. NHS choices. Back pain. Available at: www.nhs.uk/Conditions/Back-pain/Pages/Introduction.aspx (accessed 3 July 2013).