Dentistry is a very demanding profession, mentally and physically. Most dentists suffer from shoulder or back pain as a consequence of poor working posture. This Fact File looks at the causes of back pain and how to prevent it, and gives advice about treatment.

**Why do we get back pain?**
The major cause of back pain in dentistry is almost always from sitting and working with a poor posture. A large percentage of dental work is restorative, which involves a high degree of precision and working in any one of 32 different teeth (in adults), each with five surfaces facing in different directions. To obtain good vision and access, dentists tend to bend their backs, over-flex and twist their necks, and raise their arms and shoulders. Any one of these distortions may cause pressure on nerve roots, producing pain. Over a long period of time, this over-stresses the muscles and ligaments and often results in muscle spasm.

**What is the danger?**
Dentists find it easy to ignore back and neck pains when working, immersing themselves in precise technical procedures. They fail to think about and/or correct their posture and, as a consequence, often suffer discomfort at the end of the day.

**What are the long-term consequences?**
In the early stages there is pain in the muscles and ligaments. Working in a distorted posture also causes uneven pressures on intervertebral discs and facet joints in the vertebrae. This may cause the disc to bulge and put pressure on the nerve root so producing referred pain. Because it is cumulative, permanent damage to the disc may result. This is not reversible and often leads to decreased work performance, limitation of movement, disability and, increasingly, the need to give up dentistry completely.

**What can I do to eliminate back pain?**
Prevention is the answer.
First you need to learn to sit in the correct posture. The problem is that most dentists do not know what this is. Second, you must use your nurse more effectively. The ‘close support technique’ (also called ‘four-handed’ dentistry) allows better access and vision and helps to reduce distortions and prevent back pain.

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### Table 1 summarises common pain sites and their causes.

<table>
<thead>
<tr>
<th>Site</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck</td>
<td>Over-flexion and lateral twisting</td>
</tr>
<tr>
<td>Shoulder</td>
<td>Elbow raised</td>
</tr>
<tr>
<td>Arm and fingers</td>
<td>Over-flexion and twisting of neck - referred pain</td>
</tr>
<tr>
<td>Upper back</td>
<td>Over-flexion of thoracic spine</td>
</tr>
<tr>
<td>Lower back</td>
<td>Over-flexion of lumbar spine</td>
</tr>
<tr>
<td>Hip joint</td>
<td>Over-splaying of thighs when seated</td>
</tr>
<tr>
<td>Thigh (sciatica)</td>
<td>Over-flexion of lumbar spine (referred pain from L4/5)</td>
</tr>
</tbody>
</table>

**What is the correct seated height?**
With the feet firmly on the ground, the dentist should sit so that the UPPER borders of the thighs are at a minimum of 15° to the horizontal (Figure 1). Dentists need a stool with a broad, rectangular (not round) seat to give plenty of support. It is also important that the stool has a very firm, positive lumbar support.

![Figure 1 Correct seated posture – top of thigh at 15°](image-url)
What is the correct posture?

The correct posture is called "perfect posture" (Figure 2).

Ensure that the dental chair is totally flat to maintain the patient in a truly horizontal position. Position the headrest so that the frontal plane of the patient’s face is totally horizontal and with the top of their head right at the top of the headrest. Then move as near as you can to the patient. Failing to do any one of these will cause you to bend your back (hyper-flexion).

Adjust the long axis of your torso so that it is almost vertical and the shoulder line horizontal. Your upper arms should hang vertically with the elbows in light contact with the side of the ribcage. Your thighs should not be splayed more than 30°, with the hip line also horizontal.

The patient’s height

Adjust the patient’s height so that the working point in the mouth is at your own close focal distance. This is usually at about mid-sternal (or heart) level and in the midline. With the patient at this correct height you will notice that your forearms slope upwards from elbow to fingertips. Dentists are often taught that the patient’s head should be in or near the dentist’s lap, but this is quite wrong as it will place the work point beyond your focal distance and cause you to bend over to allow you to focus.

As mentioned above, it is important to ensure that your upper arms are hanging vertically with your elbows in light contact with the sides of your body – this contact stabilises your forearms and hands. The forearms can then be raised, pivoting only at the elbow joint to place the fingers at the correct height. This will produce the correct posture and also give you more control over fine finger movements and therefore greater accuracy in your work. Your head should then be tilted downwards by no more than 20° to bring the line from your eyes to the mouth as near vertical as possible. Your interpupillary axis should be horizontal at all times.

How can I maintain the correct posture while working?

Always ensure that the frontal plane of your face is in a parallel relationship to whatever tooth surface you are working on. To maintain this, employ the following five variables (Figures 3a to e):

* Move around the chair on your mobile stool between the 09:30 and 12:30 positions (Figure 3a); never move past 9:30 as the patient’s shoulder will cause you to raise your elbow over it and make you twist your upper body and neck.

  - Rotate the patient’s head left and right, by up to 45° either side of the vertical (Figure 3b); This is well within a patient’s comfort range. Never be afraid to rotate the full 45° if necessary.

  - Tilt the patient’s head forwards/backwards using the headrest itself or asking the patient to raise or lower their chin. Tilt the head forwards when working on lower teeth and backwards, up to 20° below horizontal, when working on upper teeth – this is particularly helpful when using mirror vision (Figure 3c);

  - Slightly close the patient’s mouth to relax the muscles when you require access and vision (Figure 3d);

  - Don’t forget to raise or lower the entire patient chair so that the working point on the tooth is at your mid-sternum and so at your focal distance (Figure 3e).
What can my dental nurse do to help?
Your dental nurse should be sitting at the side of the dental chair with their left hip (assuming that you are working right-handed) as near as possible to the patient’s shoulder and with their eye level 10cm higher than the dentist’s. From this position the dental nurse will be able to improve your vision and access by aspirating fluids and retracting soft tissues, as well as passing and exchanging instruments and materials. Many other activities can be delegated successfully to take the pressure off the dentist. If the dentist has good vision and access of the working area, this will promote good posture at all times.

Common faults in positioning?
Dentists should always remember that when adjusting the patient height they themselves must be sitting in the correct seated posture and at the correct height. Table 2 summarises the common faults in positioning and how to correct them.

### Table 2: Common faults in positioning

<table>
<thead>
<tr>
<th>Fault</th>
<th>Consequence</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient’s chair too low</td>
<td>Over-flexion of the back</td>
<td>Raise the chair to your focal distance</td>
</tr>
<tr>
<td>Dentist too far away from the patient’s head</td>
<td>Over-flexion of thoracic and cervical spines and elimination of the concave lumbar curve</td>
<td>The dentist should move right up to contact the top of the patient’s head</td>
</tr>
<tr>
<td>Patient’s head too far down the headrest</td>
<td>Ditto</td>
<td>Move the patient up the chair so that the top of the head is level with the top of the headrest</td>
</tr>
<tr>
<td>Chairback tilted forward</td>
<td>Over-flexion of the back and neck particularly lumbar and thoracic spines</td>
<td>Lower chairback to truly horizontal</td>
</tr>
<tr>
<td>Headrest tilted too far forward</td>
<td>Over-flexion of the neck in order to maintain vertical eye line</td>
<td>Tilt headrest further back to produce horizontal frontal plane in the patient</td>
</tr>
<tr>
<td>Excessive twisting of cervical and thoracic spines</td>
<td>Neck / shoulder / upper arm pain</td>
<td>Rotate patient’s head and move dentist’s location</td>
</tr>
<tr>
<td>Using direct vision to see upper teeth:</td>
<td></td>
<td>Lower backrest to horizontal and headrest tilted below horizontal Use mirror vision</td>
</tr>
<tr>
<td>Back rest not flat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head rest not flat</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Apart from maintaining good posture, what else will keep you fit for work?
However good a dentist’s working posture is and however particular he/she is about maintaining it, exercise on a regular basis will help to maintain mobility and flexibility of all the joints of the body.

A regular exercise regime is essential, particularly swimming, aerobics and Pilates, which help to keep all joints flexible and also strengthen muscles. Learning how to sit in a good posture, both at work and leisure, is also important. For the latter, choosing furniture (including your bed) that gives good lumbar support is extremely important.

What treatments are available?
See your doctor if you suffer from an acute bout of pain, or persistent back pain that does not go away, even after following the advice given in this Fact File. The doctor might prescribe anti-inflammatory analgesics or suggest that you seek specialised treatment with a physiotherapist, osteopath or chiropractor - see overleaf.

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*Note: The diagrams in this Fact File are reproduced from Paul E, Team Dentistry (1992).*
Further reading

Consumers’ Association. Avoiding back trouble; 1978

Lee S. Fit for the job. BDA News January 2004; 17(1): 23

McKenzie R. Treat your own back. Spinal Publications New Zealand Ltd; 1985

National Back Pain Association. Which back and neck pain treatment (video); 1996

Paul E. Working posture: The right and the wrong. BDA News October 2003; 16(10):26-27

Paul E. Team Dentistry. Martin Dunitz; London 1992

Paul E. Are you sitting comfortably? Dental Update November 1981: 559


Paul E. Sit right, see right, do right. Launchpad 1996; 3(3): 24–26

Paul E. Working posture: The right and the wrong. BDA News October 2003; 16(10): 26–27

Relevant organisations

Physiotherapists are excellent in relieving muscle spasm, which is often the cause of pain, particularly in its early stages. However, be sure that you choose a therapist who is chartered.

Chartered Society of Physiotherapy
14 Bedford Row
London
WC1R 4ED
Tel.: 020 7306 6666
Fax: 020 7306 6611
Website: www.csp.org.uk

You may need manipulation of your spine, which is particularly powerful. This is performed by an osteopath; be sure you choose one who is on the Register of Osteopaths.

General Osteopathic Council
176 Tower Bridge Road
London
SE1 3LU
Tel.: 020 7357 6655
Fax: 020 7357 0011
Website: www.osteopathy.org.uk
E-mail: info@osteopathy.org.uk

You may prefer to see a chiropractor. They use slightly different manipulative techniques to osteopaths. Again, be sure to choose one who is registered.

British Chiropractic Association
Blagrave House
17 Blagrave Street
Reading
Berkshire
RG1 1QB
Tel.: 0118 950 5950
Fax: 0118 958 8946
Website: www.chiropractic-uk.co.uk
E-mail: enquiries@chiropractic-uk.co.uk

The ‘Alexander Technique’ is postural therapy that teaches how to change old postural habits and learn new ones. This is important not just in dentistry, but for everyday activities too.

The Society of Teachers of the Alexander Technique
1st Floor
Linton House
39–51 Highgate Road
London
NW5 1RS
Tel.: 0845 230 7828 / 020 7284 3338
Fax: 020 7482 5435
Website: www.stat.org.uk
E-mail: office@stat.org.uk

Once a course of treatment is finished, ensure that you follow the rules for correct posture and seated height that are outlined in this Fact File – this will prevent any recurrence. Remember that any damage you do may often be irreversible.

Acknowledgement

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