

Top tips for preventing musculoskeletal disorders and optimising posture for dental professionals

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Introduction

There cannot be many members of the oral healthcare team who have not suffered from musculoskeletal aches and pains on a regular basis, but little emphasis is placed on this area of health and its effect on the dental team.¹

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Dental professionals are one of the highest risk groups for developing musculoskeletal disorders (MSD).² Neck, back, shoulder and wrist pain are most commonly reported amongst dentists, dental therapists and dental hygienists.³

To ensure a successful and lengthy career, looking after our health, both physical and mental is vital. Dentistry is a physically demanding profession, with clinicians having to adopt static positions for extended periods of time to facilitate good vision and access. Reduced productivity, frequent absences and early retirement have all been correlated to MSD-related pain.⁴ When investigating causes of ill-health retirement within dentistry, MSDs were reported to be the most common cause.^{5,6} Therefore, it is crucial that dental professionals are equipped with tools to prevent and manage MSDs as the long-term consequences can be severe.

In this article we provide a series of practical tips to minimise MSDs and improve posture for all members of the oral healthcare team. The tips are borne from years of experience and observation of serious ill effect when good posture in clinical practice is ignored.

Top tips

The following tips will cover:

1. Understanding posture while standing and operating
2. How to sit correctly at a screen
3. Adjusting your patient
4. Proper use of lighting and sharp instruments
5. Buying a saddle seat and loupes
6. Moving and stretching regularly.

1. Understand posture

Posture is the way you hold your body when moving (dynamic) or at rest (static). There are guidelines for dentists on ergonomics and posture from organisations such as the FDI World Dental Federation and in various papers found in dental journals.^{7,8,9} Mastering the correct posture while standing, operating, and sitting at a computer will guarantee long-term health benefits.

a. Standing posture

Your spine has three curves, which you need to maintain. You may have to retrain your body to achieve good posture if you have developed unhealthy habits over the years.



Fig. 1 a, b) Optimal standing posture. Courtesy of Peninsula Dental School staff and Carol Robinson

Standing correctly helps to distribute your weight across your joints, reducing strain and stress (Fig. 1). Try this out now:

- Stand with your feet hip width apart, ankle bones under hip bones
- Do not lock your knees, keep them soft
- Gently tilt your pelvis backwards and forwards and allow it to settle into a neutral position
- Shrug your shoulders a few times and bring them down and back so your shoulder joints are over your hip joints, and horizontal



Fig. 2 Seated posture. Courtesy of Peninsula Dental School staff and Carol Robinson

- Let your arms relax down by your sides
- Let your neck, jaw and eyes relax, and feel the crown of your head gently lift
- You should already feel taller and more evenly balanced.



Fig. 3 Gold standard clinician and dental nurse posture. Courtesy of students at Peninsula Dental School and Carol Robinson

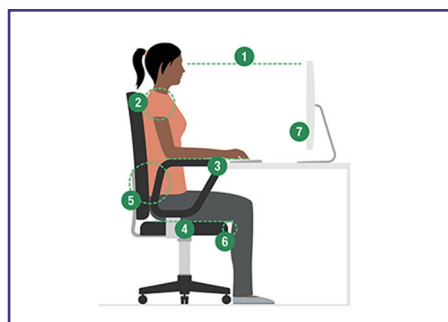


Fig. 4 How to sit at a screen. Contains public sector information published by the Health and Safety Executive and licensed under the <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

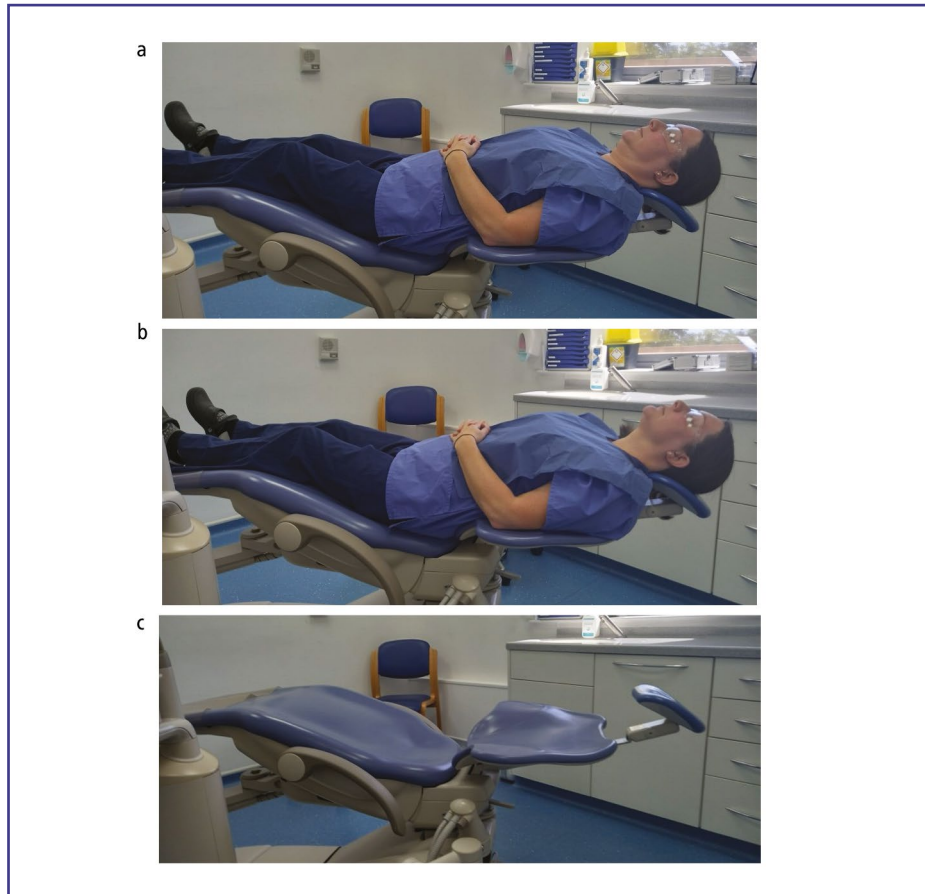


Fig. 5 a, b, c) Note position of headrest. Chin down is good for working on lower teeth, whereas chin up is preferred for upper teeth. Courtesy of Staff at Peninsula Dental School and Carol Robinson

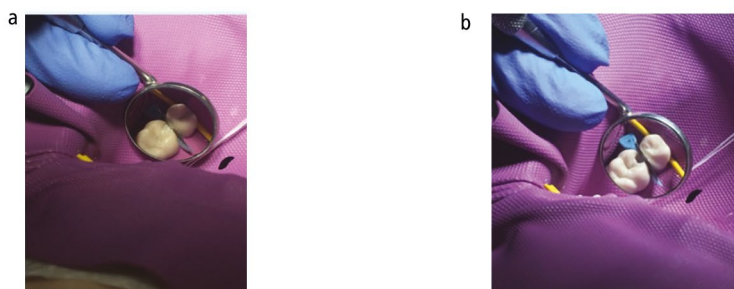


Fig. 6 a) Improper use of lighting can cause shadows. b) Adjusting the operating light to reflect the light back from the mirror into the cavity is a game changer. Courtesy of Carol Robinson



Fig. 7 Perio tray courtesy of Peninsula Dental School and Carol Robinson

b. Posture for the seated clinician

Healthy sitting posture while working is critical for preventing musculoskeletal disorders, as it encompasses a large part of the working day (Fig. 2):

- Sit in a stable, upright, symmetrical position⁸
- Lower legs vertical
- Look perpendicularly onto the surface you are working on either by direct vision or in the mirror
- The oral cavity should be at mid sternum height
- Your forearms should be horizontal or no more than 25° up from horizontal, and elbows should be tucked in
- Head should be tilted no more than 20° in any direction
- Move your chair or the patient so you can maintain this position for 80% of your working time
- Keep the other 20% for treating those patients who cannot lie in a supine position (eg pregnant women or bariatric patients)

- Keep your delivery unit at elbow height to avoid over stretching.

Even with gold standard posture, staying in one position for too long – known as prolonged static postures (PSPs) – can result in muscle stiffness and disorders.¹⁰ Make sure you move around every now and then to avoid PSPs.

c. Posture for the dental nurse

- Sit in an upright position
- Should be sitting higher than the clinician, so that the dental nurse's eyes are approximately 10 cm above the clinician's (Fig. 3)
- Stand up if you need to¹¹

2. How to sit correctly at a screen

You may need to adjust the height of either your desk, chair, table or screen to achieve the optimal seated position (Fig. 4).

- Sit with both feet flat on the floor, lower legs vertical and a 90° angle behind your knees^{4,6}
- Sit up straight with relaxed shoulders²

- Allow the back of your chair to support you⁵
- Shoulder joints above hip joints²
- Fore arms flat on desk or table³
- The top of your screen should be level with your eyes¹
- The screen should be about an arm's length away.⁷

3. Adjust the patient

- The patient should lie supine, only then can you achieve good posture yourself
- Ensure they have pulled themselves right back into the angle of the chair
- Adjust the double articulating headrest correctly: practise with a colleague to find how comfortable this is, even though it looks very odd
- The headrest should support the head on the back of the skull on the mastoid bone
- Use a wipeable cushion or folded towel if the gap between chair and headrest is long
- Adjust the headrest so the patient's chin is up when treating upper teeth, down when treating lower teeth (Fig. 5)



Fig. 8 a) Poor posture from both clinician and dental nurse; b) improved by sitting correctly on saddle seat, wearing loupes and correcting position of operating light. Courtesy of staff at Peninsula Dental School and Carol Robinson

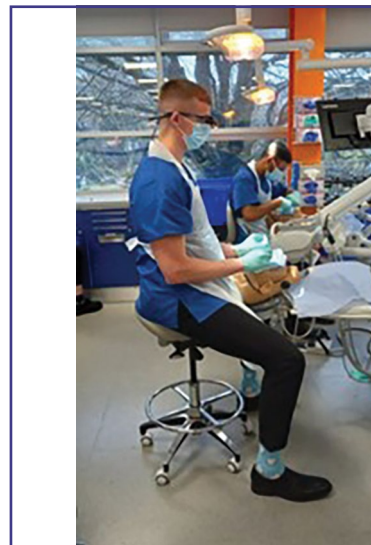


Fig. 9 Refractive loupes and a saddle seat allowing excellent seated posture for an extremely tall ex-basketball player. Courtesy of student from Peninsula Dental School and Carol Robinson

- Ask the patient to move their head as required.

4. Lighting

a. Proper use of:

- Your operating light should be positioned so the light runs parallel to your line of vision
- Use your mirror to reflect the light into the cavity, no shadows! (Fig. 6a)
- If you use a light on your loupes, do not forget to use the operating light (Fig. 6b). Your dental nurse would like to see as well.

b. Use sharp, ergonomically designed instruments¹²

- Use light instruments which have a large diameter (Fig. 7)
- Instruments with a textured grip are easier to grasp, beneficial during scaling (PMPR) as the amount of force required is reduced
- Hand fatigue can be minimised by using sharpened instruments
- Instruments may be sharpened in practice with the right tool and technique or can be sent for professional sharpening.

5. Buy an ergonomic seat

Buying an ergonomic seat, especially one that is saddle shaped is a great investment and can make achieving good posture so much easier. Once adjusted correctly, this will allow you to sit with a correctly aligned spine. Try out various makes until you find the one that suits you best. Tilting the seat 5–15 degrees allows for a closer position to the patient with less lower back strain. If chairs cannot be tilted, then a wedge-shaped cushion can be used.

6. Use magnification loupes

You are executing precise movements in a dark, wet cave that keeps moving. Use of magnification loupes with a direct light source not only helps meet your visual demands but has demonstrated improved posture and reduced musculoskeletal pain.^{13,14}

- Choose a pair of loupes that suit your daily needs, has an angle of declination of 40° and a light to go with it
- General dentistry needs no more than 3.5x magnification. Save high magnification and costs for the specialists!
- Try refractive loupes; they ensure the neck stays upright.

See Figures 8 and 9.

7. Move and stretch!

Static muscle pain occurs when the load on the muscles is constant and unrelenting throughout an activity.

- Stand up and move about between patients

- Walk or bike to work if you can or go for a short stroll at lunch time
- Stretch your neck, shoulders, lower back, hands, and wrists regularly – especially between patients and at the end of the day
- Take a few seconds during a long procedure to be mindful of posture and muscle strain
- Ten minutes of daily stretching can make a world of difference, as will attending a Pilates or yoga class for a full body stretch
- Make friends with your physiotherapist, osteopath, chiropractor, or massage therapist.

There are several online materials available to correct posture, avoid fatigue and move better including exercises to avoid wrist and hand strain¹⁵ and videos of exercises and tips for better posture by physiotherapists.¹⁶

Conclusion

The tips provided in this article are pragmatic and achievable by all, with the benefits being abundant. Using these tips may be the difference between an early ill-health retirement and a long fruitful career as a dental professional.

Photos: Permissions obtained for this publication.

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References

1. Kawtharani A A, Chemeisani A, Salman F, Younes A H, Msheik A. Neck and musculoskeletal pain among dentists: A review of the literature. *Cureus* 2023; doi: 10.7759/cureus.33609.
2. Lietz J, Kozak A, Nienhaus A. Prevalence and occupational risk factors of musculoskeletal diseases and pain among dental professionals in Western countries: A systematic literature review and meta-analysis. *PloS One* 2018; doi: 10.1371/journal.pone.0208628.
3. Chenna D, Pentapati K C, Kumar M, Madi M, Siddiq H. Prevalence of musculoskeletal disorders among dental healthcare providers: A systematic review and meta-analysis. *F1000Res* 2022; doi: 10.12688/f1000research.124904.2.
4. Edrees A, Abu Rayyan I, Splieth C H, Alkilzy M, Barbe A G, Wicht M J. Musculoskeletal disorders and risk indicators for pain chronification among German dentists: A cross-sectional questionnaire-based study. *J Am Dent Assoc* 2024; **155**: 536–545.
5. 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; doi: 10.1038/sj.bdj.2010.813.
6. Al-Emara Z, *et al*. Musculoskeletal disorders and work ability among dentists and dental students in Finland. *Work* 2024; doi: 10.3233/WOR-23030.
7. FDI, World Dental Federation. Ergonomics and posture guidelines for oral health professionals. 2021. Available at <https://www.fdiworldddental.org/ergonomics-and-posture-guidelines-oral-health-professionals> (accessed May 2024).
8. Hokwerda O, de Ruijter R, Shaw S. Adopting a healthy sitting posture during patient treatment. January 2009. Available at [https://www.rug.nl/research/ctm/kenniscentrum/ergonomie/pdf/ergonomie/1adoptingahealthysittingworkingpostureduringpatienttreatment.\(jan2009\).pdf](https://www.rug.nl/research/ctm/kenniscentrum/ergonomie/pdf/ergonomie/1adoptingahealthysittingworkingpostureduringpatienttreatment.(jan2009).pdf) (accessed May 2024).
9. Breslin M, Cook S. No turning back: posture in dental practice. *BDJ Team* 2015; doi: 10.1038/bdjteam.2015.164.
10. De Sio S, Traversini V, Rinaldo F *et al*. Ergonomic risk and preventive measures of musculoskeletal disorders in the dentistry environment: an umbrella review. *PeerJ* 2018; doi: 10.7717/peerj.4154.
11. Paul E. Posture technique. *Br Dent J* 2008; **204**: 169–170.
12. HuFriedy Group. Ergonomics in the dental office – how to care for patients while also caring for yourself. 2020. Available at: <https://hufriedygroup.eu/en/blog/ergonomics-dental-office-how-care-patients-while-also-caring-yourself> (accessed May 2024).
13. Plessas A, Bernardes Delgado M. The role of ergonomic saddle seats and magnification loupes in the prevention of musculoskeletal disorders. A systematic review. *Int J Dent Hyg* 2018; **16**: 430–440.
14. Lietz J, Ulusoy N, Nienhaus A. Prevention of musculoskeletal diseases and pain among dental professionals through ergonomic interventions: A systematic literature review. *Int J Environ Res Public Health* 2020; doi: 10.3390/ijerph17103482.
15. Ultradent Products Inc. Say goodbye to wrist and hand fatigue. 6 September 2018. Available at: <https://blog.ultradent.com/5-easy-exercises-to-help-dental-professionals-prevent-hand-and-wrist-fatigue> (accessed April 2024).
16. Posturedontics: Dr Bethany Valachi. Solving work related pain in dentistry. Available at: <https://posturedontics.com/product-category/online-course/> (accessed April 2024).

<https://doi.org/10.1038/s41407-024-2852-3>