
ACUTE BACK PAIN AMONG DENTISTS

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Summary

This is a review article, about the incidence of low back pain in dentist, it also contains a detailed review about the relation between back pain, exercise and posture, with special emphasis on the prophylactic measurements.

Introduction

Back pain, is the most common work related Musculoskeletal disorders. Over 70% of the population will suffer from back disorders at least once in their lifetime^{1,2}.

More than 65million Americans experience low back pain every year, and it is one of the most common problems for which people visit a doctor^{3,4}.

Most commonly, back pain is caused by muscle strain resulting from a sudden twisting or jerking movement. Poor posture, excessive body weight, and lack of proper exercises may aggravate this⁵.

Bad posture is probably the commonest cause of persistent back pain.

A sprain, or muscle tear, usually occurring within 24 hours of heavy lifting or overuse of the muscles

commonly causes acute pain in the lower back that does not extend to the leg.

Most of acute pain is mechanical and the chronic strain of the muscles of the lower back may be caused by job-related stooping, bending, stressful postures and obesity. The most common site for pain is the lower back, because it bears the most weight and stress.

Factors, which may contribute to lower back pain including poor muscle tone, excess weight and improper or heavy lifting. In- addition, poor posture and sitting or standing in one position for a long time puts extra stress on the back^{5,6}.

Back pain is relatively common among dentists, and this problem relates to their working postures, equipment design and duration of working.

Acute back pain among Dentists is due to stress, tension and postural practice. Dental procedures are usually long and require much more concentration in a limited work area. In addition, the repetitive daily activity patterns when

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treating patients makes work more demanding.

It has been stated that the most common site of pain among dentists is the area of lumbar vertebrae. The shape of the vertebral column, aging changes, weak muscles, postural practice, movements, lifting techniques, and mechanical stress have been identified as factors that contribute to back pain in general⁷.

The spine depends for its strength on maintaining a series of arches. Sitting and leaning forward tend to flatten the arches, so it is important to keep back's natural curves aligned, balanced and well supported.

The nature of dental work means flexion of the lumbar spine and subsequent loading on the intervertebral discs or extra tension in the spinous ligaments while bending and twisting to gain better access and visibility within the oral cavity.

Postural faults among dentists are excessive bending and twisting, bending forward from the waist, elevation of the shoulders^{8,9}. Mental stresses and postural positions inherent in the dentist's work result in more strain on their spine while working. (Figure 1)



Figure 1. Excessive forward bending: The soft tissues surrounding the spinal column (i.e. muscles, ligaments, and joint capsules) are stretched and strained. Stresses are also put on the spinal column.

The daily repeated deviated body positions of the dentist were associated

with an increase in their work-related musculoskeletal complaints. (Figure2)



Figure 2. Poor posture with excessive bending and twisting of the spine. When maintaining such posture for long periods, fatigue, discomfort, or pain can result even if the soft tissues are not structurally altered. More significantly prolonged exposure to these postural stresses may lead the soft tissue to adaptively change, and may lead to pathological effects and permanent disability in the long-term.

Biller in 1949 first reported that there was a 63% prevalence of back pain among dentists¹⁰.

Bassett in 1989 stated that for many dentists backaches are likely to be related to muscular tension and poor working postures and the incidence of back problems was over 60%⁷.

Canadian dentists found that 65% had suffered back pain at some times in their lives.

Dentistry is one of the ten jobs, with the highest prevalence of low back pain due to muscle strain at work^{11,12}.

Dentists are on their feet all day and they spend most of their time with their hands inside a nervous patient's mouth, which is a very small place. For a dentist with a busy practice the stress can be relentless

Causes of Low Back Pain:

- straining the muscles or ligaments
- pressure on the intervertebral discs
- nerve compression or entrapment

- damage to the vertebra

In a review of the research literature, the National Institute of Occupational Safety and Health concluded, “muscle strain is probably the most common type of work or nonwork back pain”^{6,13}.

Sprains -Strains

Sprains and Strains often result from excessive physical demands on the back.

Sprains and Strains are similar disorders affecting different soft tissue in the spine. Sprains are limited to ligaments whereas strains affect muscles, tendons or muscle-tendon combination.

The health of the intervertebral discs plays a major role in back injuries. If discs are damaged and begin to degenerate, the back loses flexibility and the capacity to absorb the daily forces associated with standing, moving and working. Intervertebral discs don't have a normal blood supply, instead, as the discs change shape as we move around, nutrients are drawn into the discs and waste products are pumped out. Moving the body helps this process by intermittently changing the forces on the discs. Moving around helps to keep the spine healthy.

Risk factors for Low Back injuries

With data from over 40 research studies, it is found that the major risk factors for back injuries are:

- 1) heavy physical work
- 2) lifting and forceful movements
- 3) bending and twisting (awkward postures)
- 4) whole-body vibration (WBV)
- 5) static work postures.

These work-related risks for injuries can occur separately or in some combination. The more of these factors happening at any one time the greater the risk of injury^{5,6}.

Standing Work

When we are standing, the pressure on the intervertebral discs of the lower back is fairly low, much lower than say when we sit unsupported on uncomfortable chairs. But, standing uses about 20% more energy than sitting, so we get tired more quickly and look to sit down. When we are standing we need to bend down to pick up objects or stretch up to get overhead objects. In all of these instances there is an increase in the forces on the lower back, and that's when an injury is most likely to occur^{14,15}.

5 Tips to minimize injury risks during Standing Work.

The following tips will help you to minimize your risks of low back injury when you are doing standing work:

- 1) **Remember to move around:** Moving is important to keeping the spine healthy and it will also help to improve circulation and reduce muscle fatigue.
- 2) **Take breaks and stretch:** Recent research has confirmed that frequent brief rest breaks help to reduce fatigue and musculoskeletal discomfort. Gentle stretching during a break will help to ease muscle tension and improve circulation.
- 3) **Watch your posture:** Pay attention to how you are standing!
 - Stand in a stable posture with you feet on a firm surface.
 - Try to avoid twisting the lower back around to reach things and move your feet so that your whole posture changes instead.
 - Try to minimize bending movements. If you must bend for objects that are in front of you try to bend at the knees rather than the back. If you must bend for objects to the side of you try changing your stand so that you are facing

the object, and then bend down at the knees.

- Avoid overreaching - if you must reach up to a high level, get something firm to stand on, such as a stool or steps.
 - Avoid reaching over obstructions - if possible move the obstructing object or change your position before you reach for what you need.
- 4) **Lean where you can:** Leaning on a solid support help to reduce fatigue when you're standing. This might be a support that you can lean back against, a support that you can lean against sideways, or a support that you can lean forwards against or hold on to.
- 5) **Keep your back strong:** try to exercise to strengthen your back muscles and to maintain flexibility.

Prevention

Low back pain due to muscle strain can be prevented by life style choices including regular physical exercises and weight control, avoiding smoking, and learning the proper techniques for lifting and moving heavy objects¹⁶.

Exercises

Exercises designed to strengthen the muscles of the lower back and adopting new ways to sit and stand and designed chairs or car seats with lumbar supports are also recommended¹⁷.

Advice on concerning bad postural habits may be difficult for a dentist to accept and may need to be reinforced through programs of aerobic exercises.

Dentists may learn the relaxation techniques during working and must learn the correct working positions at chairside¹⁸.

Aerobic exercises have been reported to improve or prevent back pain. In general, exercises that facilitate weight loss, trunk strengthening of musculo-

tendinous structures appear to be helpful in alleviating low back pain¹⁹.

Patients who exercise get better faster, and if they keep exercising, are less likely to have further episodes.

Good posture is a full -time job. The exercises that give the basic training and skills to move safely must be applied to every day living, through each day²⁰.

Daily back exercises are an important key to developing a healthier back, relieving pain, and preventing injury.

Stretching exercises help to increase flexibility. Muscle building exercises restore strength and increase the muscular foundation of good posture.

Stretching abdominal and back muscles gives good control of pelvic tilt and provides sound support to all spinal elements.

Commitment to daily exercises and strengthening program will develop a new body awareness to control spinal posture automatically²¹.

Strengthening of back muscles is probably the most important step in the treatment of most causes of back pain. By increasing strength and flexibility of back muscles, weight is better distributed, and less force is placed on the spine.

A regular walking or swimming program is an excellent choice for some one who has low-back pain.

Recommendations for Back Disorders

Recommendations for minimizing the risks of back injuries focus on improving working posture and equipment design.

These include:

- 1) Change Posture - Alternate between sitting and standing to reduce postural fatigue and maximize postural variety, which helps to reduce static muscle fatigue.
- 2) Use Support - When sitting or standing, don't lean forwards or stoop in an unsupported posture for prolonged periods. If you are sitting, sit up straight or recline slightly in a chair with good back support, and use a good

footrest if necessary. If you are standing for prolonged periods try to find something to help you lean against.

- 3) Safe reaching - Avoid having to reach awkwardly to equipment and work close to the patient. Keep the items used most frequently within a distance of about 50 cm. Use assistants to help move equipment into this zone.
- 4) Normal arm posture - Keep elbows and upper arms close to the body and don't raise and tense the shoulders when working. Also, ensure that hand postures are not deviated because this could lead to wrist problems.
- 5) Use Comfortable Equipment - Use equipment that isn't too heavy, that can be used without awkward upper body posture, and that feels comfortable to use.
- 6) Manage Time - Avoid long appointments where possible, or incorporate these with frequent short rest breaks in which you change posture and relax the upper extremities.

As a dentist, the seat is probably one of the main causes of back pain. If a seat does not allow the pelvis to maintain its neutral position during work it will cause spinal stress.

A good sitting posture maintains the spinal curves.

The seat must be designed to allow the dentist to work seated and to maintain good posture and natural curves, even when leaning forward, and to maintain the pelvis in its neutral position, the same as it is in standing position.^{22,23,24}

The preferred way of sitting involves the following:

- Make sure that the seat height is correctly adjusted so that your feet are on the ground or on a solid surface like a good footrest.
- Recline back in the chair, with the chair backrest angled

between 100-110-degrees, so that the chair back can help support the weight of the torso.

- Make sure that the chair has good lumbar support in the right area for your shape and size of back. If there is an adjustable support, use this to get the best position. If not, use a rolled towel or a cushion to improve your lower back support.
- Make sure that the seat pan is the right size for you and doesn't press behind your knees.
- Look for a chair that doesn't tip up the seat pan when you recline because this can put pressure under the thighs and behind the knees.
- If the chair has arms, make sure that these are correctly adjusted for height so that your shoulders are relaxed, not hunched or raised when you rest on the armrests.
- If the chair has a high neck/headrest make sure that this can be used in different sitting positions.

Now that your body is in a good, supported posture you should be ready to work without any discomfort, but remember to take periodic breaks, and to change posture, get up and move around.

Tips for Choosing the Best Chair

When choosing a chair ask yourself the following questions:

1. Is the chair comfortable to sit in for the way that you work?
 - a) Does the shape of the seat fit you and let your legs move freely?
 - b) Is the cushioning comfortable and made of a breathable material?

- c) Do you have at least one-inch free space on either side of your hips and thighs?
 - d) Do you have at least one-inch free space between the edge of the seat and the back of your knees?
 - e) Can you sit comfortably with your feet on the floor or a footrest?
2. Can you easily adjust the important features of the chair?
- a) Can you adjust seat height while you are sitting in the chair?
 - b) Is the range of height adjustment of the chair adequate?
 - c) Can you adjust the position of the lumbar support and is this comfortable?
 - d) Can you recline the chair back to a comfortable position?
 - e) Are the controls easy to understand and use?
3. Is the chair stable when you sit on it?
- a) Does it have 5 pedestals so it won't easily tip over?
 - b) Does the chair move easily when you need to?
 - c) Can you swivel easily so that you don't have to twist your back to turn?
4. Does the chair have comfortable armrests?
- a) Are the armrests broad, contoured, and adequately cushioned?
 - b) While sitting can you adjust the height of the armrests?
 - c) Can you easily move the arms out of the way if you need to do this?

If you answered "No" to any of the questions then the chair you are considering might not be right for you. If you answered "Yes" to all of the questions, then this chair will work for you.

Remember that you will probably sit for a large part of your life, so make sure

that your chair is a source of comfort and pleasure, not discomfort and pain.

How to Maintain a Neutral Spine while Sitting

Choose to sit in a chair that offers proper low back support. Don't slump in the chair! Try to keep the hips and trunk at a 90-degree angle. Try to sit close to the work area and keep the feet flat on the floor or supported on an appropriate footrest. Think about keeping the chin tucked in while the head and shoulders are erect and balanced. Get up and/or change positions frequently. Don't become 'glued' to the seat. Get up and stretch!

Tips for managing stress:

- First, learn to relax. There are many ways to relax and relieve stress without using drugs or without spending a lot of money.
- Take a warm bath.
- Take 10-15 minutes to sit quietly and breathe deeply.
- Get involved in your favorite hobby or learn a new hobby.
- Start an exercise program.
- Take a short nap.
- Find a comfortable place for light reading.
- Meet a friend for a walk or a chat.
- Eat regular meals and take time to enjoy them.
- Plan fun activities with your family or friends.
- Do something nice for yourself.
- Learn relaxation techniques and set aside time to practice them.
- Learn to accept what you cannot change instead of feeling constantly frustrated.
- Try laughing instead of taking things too seriously. Take a positive outlook.
- Learn to manage your time effectively.

- Get professional help with problems or stresses that continue to bother you.

Prognosis

The prognosis for most patients with acute low back pain is excellent. About 80% of patients recover completely in 4-6 weeks.

Treatment

Acute back pain is treated with nonsteroidal anti-inflammatory drugs (NSAIDs), muscle relaxant. Applications of heat or cold compresses are also helpful to most patients.

Reassurance and appropriate activities are the best treatment (avoid lifting, carrying or bending) a progressive exercise program of isometric stretching, and aerobic conditioning should be started²⁵.

Treatment for Sprains and Strains

During the first 24 to 48 hours' cold therapy helps to reduce swelling, muscle spasm, and pain by reducing blood flow to the injured area.

Medications include an anti-inflammatory (NSAIDs) and muscle relaxant and painkiller.

Most dentists recover adequately by simply avoiding strain to the back^{1,2,26}.

Conclusion

Back pain has been a common problem among dentists due to mental stresses and postural fault positions. Paying more attention to correct postures and relaxation techniques during work could reduce the incidence of this major problem.

Good posture is a full-time job. The exercises that give the basic training and skills to move safely must be applied to every day living, through each day.

Aerobic exercises proved to improve or prevent back pain. In general, exercises that facilitate weight loss, trunk strengthening of musculotendinous structures appear to be helpful in alleviating low back pain.

Patients who exercise get better faster, and if they keep exercising, are less likely to have further episodes.

Commitment to daily exercises and strengthening program will develop a new body awareness to control spinal posture automatically.

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