Getting Your Back Back To Work: Pain Relief — Where to Start?

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ABSTRACT

Dental health care workers are vulnerable to back and neck pain resulting from poor occupational posture. While numerous choices exist for treatment, this article will provide them with a practical approach to seeking out appropriate care for this common malady. The McKenzie treatment approach is discussed and recommendations for its application are presented to provide the reader with a starting point for treatment. For the dental health care worker experiencing pain and dysfunction of the back and/or neck, as more than half will during their careers, this article will seek to provide an overview of potential causes while creating a roadmap for seeking the most appropriate conservative "antidote" for their care.

Orthopedic research has shown that 70 percent to 80 percent of the population will experience transient neck or low back pain during the course of their lives.[1,2] Studies have found that 23 percent to 79 percent have symptoms that persist or recur.[3-6] A majority of dentists and hygienists have musculoskeletal complaints related to the back and neck.[7-9] Although dental practice changed from standing to sitting postures in the mid-1960s, ostensibly to decrease the incidence of back and neck problems, a decrease in the prevalence of reported discomfort has not been observed.[10] Numerous choices exist for treatment of spinal ailments including but not limited to: massage, acupuncture, chiropractic, yoga, Rolfing, Pilates, physical therapy, osteopathic, orthopedics and surgery. While there is not a one-size-fits-all approach to caring for back pain, with the proper training and advice, the majority of dental health care workers with pain can learn to treat their condition independently.

Classification systems may be a clin-

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ically relevant way to characterize different sub-groups of back and neck pain and thereby to offer pain management strategies while excluding serious spinal pathology.[11-14] This article will present a classification system for the treatment of spinal pain created by physical therapist Robin McKenzie. According to McKenzie, the majority of low back pain appears to be mechanical in nature, having been initiated by excessive mechanical forces. Such an event may result from bending down to pick something up, or getting items out of a car trunk after prolonged sitting.[15] Mechanical pain is thought to involve injury to soft tissue. There is no single reason for mechanical low back pain, but the gamut of possible causes is vast considering the number of structures in the spine that have a nerve supply and are therefore capable of producing pain.[16]

The benefit of the McKenzie approach lies in identifying the movement "preference" of an individual with back or neck pain in order to alleviate the symptoms. The approach has had favorable clinical acceptance among therapists and patients and offers a conservative alternative to treating back and neck pain. The article will provide an overview of the McKenzie approach, in order to provide the reader with back/neck pain basic information to determine the most appropriate course of action for conservative treatment of their disorder.

The McKenzie physical examination assesses four areas of relevance: 1) sitting and standing postures; 2) range of movement; 3) neurological testing assessing strength, sensation, reflexes, and dural status; and 4) directional movement preference testing. The repeated movement testing is a series of dynamic movements and loading strategies that attempt to determine a directional preference. This preference is determined by assessing the effect of the movements on pain. McKenzie advises that self-treatment should not be performed by individuals with the following complaints:[17]

- A first episode of back pain that persists for more than 10 days
- Bowel and bladder symptoms associated with back pain
- Back or neck pain caused by trauma
- Leg pain with symptoms below the knee including numbness, tingling or weakness
- Malaise
- Pain that disturbs sleep

In the event of any of these symptoms, treatment must be administered by a qualified medical professional.[17]

The treatment for mechanical pain involves identifying the correct direction to move the spine and alleviating the symptoms while limiting movements and activities that aggravate the symptoms for a period of time.

In the McKenzie assessment scheme, mechanical pain is characterized by: 1) pain that can be constant or intermittent, 2) limited range of motion of the back or neck that improves as symptoms diminish, and 3) movements in certain "incorrect," or exacerbating directions increases the pain while simultaneously decreasing range of motion in the opposite direction. The treatment for mechanical pain involves identifying the correct direction to move the spine and alleviating the symptoms while limiting movements and activities that aggravate the symptoms for a period of time. As symptoms improve, activities are reintroduced that may have been previously limited until all activities have returned to normal. For example, a patient may present with low back pain along with referred symptoms into the thigh. Following the performance of extension exercises, the thigh symptoms are abolished and remain better following completion of the exercises. This demonstrates mechanically produced pain that responds to the performance of the exercise in the correct direction. According to McKenzie, in most cases, the pain one experiences, at least initially, will have a combination of chemical and mechanical components. He proposed three nonspecific mechanical syndromes – posture, dysfunction and derangement syndromes, which are now widely used in the musculoskeletal care of the spine.[18] These three separate syndromes can be identified by their unique clinical presentations and through assessment of a specific sequence of loading strategies. Each syndrome responds to repeated and/or sustained end-range loading in different ways. Within these three syndromes we can identify and diagnose the vast majority of non-specific spinal problems[18].

Postural Syndrome

Postural pain syndrome is thought to be due to poor seated or standing posture, which stresses soft tissue structures at their end range of movement without any actual pathology. This poor posture position, if held over time, tends to decrease the blood supply to the area and overloads the supporting soft tissue structures, thus causing back pain. The hallmark of postural syndrome is that once the poor posture is corrected and the end-range stress is removed, the pain resolves. McKenzie gives the example of stressing one's finger by pushing it into an "over extended" position toward the wrist and holding it (**Figures 1 and 2**). As this position is held, pain begins to develop and tends to worsen with time. Once the

Figure 1. Overextending a finger.

Figure 2. Overextending a finger.

Figure 3a. Slouching posture.

Figure 3b. Slouching posture.

position is released, the pain subsides. In many cases the treatment is just as simple as that, once again enforcing what our mothers always told us, to "sit up straight."

In the case of the dental health care worker, poor posture is defined as forward head with rounded shoulders, flexed thoracic and lumbar spine, with the pelvis posteriorly tilted; also called slouching (**Figure 3**). Whether due to training, habit, or fatigue, slouched posture appears to be a regular part of the working day in the dental clinic. The ill-effects of poor seated posture are coming to light in the literature. Recently published studies have confirmed that slouched sitting causes the spinal musculature to diminish its activity and place increasing stress on the posterior ligamentous structures of the spine resulting in increased length or "creep."[19] Bogduk defines creep as a constant force, that if left applied for a prolonged period to collagen tissue will result in further movement or length of the ligamentous tissue.[16] This creep phenomenon when combined with diminished muscular activity is thought to result in an imperceptible increase of unprotected movement of the lumbar spine and thought to place it at greater risk of injury. He went on to say that sustaining a flexed posture also reduces the resistance of the spinal ligaments. This reduction in resistance makes the spinal support structures weaker and thus, increases the chance of injury. In animal studies, it was found that the amount of time to cause the creep phenomenon to occur was as little as 20 minutes. Recovery took more than 24 hours and never returned to the original resting tissue length. It has been theorized that the combination of diminished muscle activity, combined with ligamentous creep may, in fact, lead to musculoskeletal cumulative trauma disorders over time as the amount of soft tissue damage exceeds the rate of repair and recovery in humans. It may also explain why individuals may experience ongoing or chronic low back pain over time with no apparent pathological condition with radiographic and other special studies.[19] Clinically, individuals with back pain may seek treatments that only address their symptoms and do not get at the cause of the problem. Having a one-hour massage may alleviate the discomfort for that particular day, while returning to the same slouched seated posture the next day causes a return of the symptoms.

McKenzie theorized that the behavior of the lumbar discs mimics that of a soap cake between one's palms, wherein squeezing the palms backwards, the soap moves forward and squeezing the fingers together, the soap moves toward the wrist. This being the case, it can be seen that compressing the anterior aspect of the disc during forward flexion of the spine will cause the nucleus to migrate posteriorly and stretches the posterior annulus.[20-23] With spinal flexion, the vertebral canal is lengthened and this places tension on the spinal cord and peripheral nervous tissues. Flexion caus-

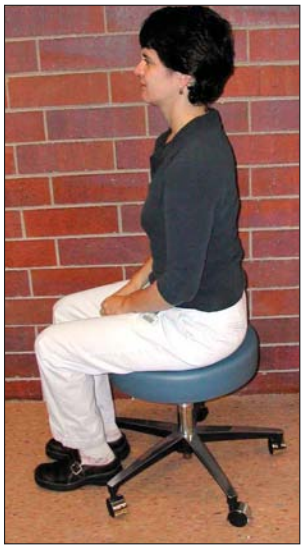

Figure 4. Good posture. Note the ear, shoulder and hip are in line.

es an increase in intradiscal pressure of up to 80 percent.[24] Conversely, extension of the spine compresses the posterior aspect of the disc moving the nucleus anteriorly.[19-23] The intradiscal pressure is decreased up to 35 percent with extension.[24] Andersson identified changes in intradiscal pressure with changes in posture in an historical publication. Slouched seated posture with weighted upper extremities demonstrated the highest intradiscal pressure of all postures measured. He found that in the unsupported sitting position, the highest level of myoelectric activity was in anterior sitting and the lowest in posterior sitting. Both myoelectric activity and disc pressure were found to decrease when the back was supported, particularly as the lumbar support was increased and armrests were used.[25] Anatomically, it is known that the posterolateral aspect of the disc is the weakest point of the structure with less radius, not as firmly attached to the vertebral end-plate, and not covered by the posterior longitudinal ligament.[26,27] If the "creep" phenomenon evidenced above holds true, recovery takes up to 24 hours irrespective of the load. Dentists and hygienists have been observed to assume a notably forward flexed posture greater than 50 percent of the time that they are working with their patients.[28] When a flexed posture is maintained, the stress of holding this position will fatigue the posterior annulus of the disc, overcoming its strength. If overstretching of the annulus exceeds 4 percent, irreversible damage will result.[29] As dental health care workers, sitting in this relatively poor position for extended periods of time is a natural part of the working day and may, in fact, lead to debilitating spinal disorders.

By adjusting the chair and oneself in a good, balanced, seated posture where the spine has assumed its natural curves, surviving the stresses of the work day becomes much easier.

When back pain sufferers are evaluated, measurement of their back strength has been found to be diminished.[30-32] The question of whether the weakness is a result of the back pain, or the back pain is a result of the weakness remains to be answered. There is, however, evidence to show that isolated strengthening of the back extensor muscles had a positive effect on complaints of low back pain.[30-32] Clinically, we often see significant weakness of the back extensor and posterior scapular musculature with an associated tightness of the anterior chest and shoulder musculature in individuals having back and neck pain. Additionally, we find weak abdominal musculature and tightness of the suboccipital soft tissue structures. If we were to combine the effects of weakness with limited mobility, stress, and fatigue in the working day, it is easy to see how this scenario can become problematic. For dental health care workers, good posture is a key ingredient to successful practice. For the purpose of clarity, we will define good posture as that position which places the ear over the shoulder, the shoulder over the hip, while the legs are supported and parallel or slightly inclined (knees lower than the hips approximately 5 degrees) with the feet supported on the floor (**Figure 4**). In a recent article by Pynt et al., the authors concluded that lordosed seated posture, regularly interspersed with movement, is the optimal seated posture and assists in maintaining lumbar postural health and preventing low back pain.[33] Balancing the spine while seated provides a more stable base from which to work with less stress.

McKenzie promotes the use of a "lumbar roll" in order to re-establish and support the natural lordosis of the spine and a cervical roll for sleeping to support the neck. He theorized that one of the main culprits causing low back pain is the loss of this lordosis in the lumbar and cervical spine, combined with excessive flexion of the spine throughout the day. In speaking with the average dental practitioner, they report not using the back of the operator chair regularly. In fact, some report not adjusting the chair prior to beginning their treatments. As a simple preventive strategy, adjusting one's chair prior to beginning work may counteract the ill-effects of poor seated posture. By adjusting the chair and oneself in a good, balanced, seated posture where the spine has assumed its natural curves, surviving the stresses of the work day becomes much easier. With the spine balanced, the head is over the shoulders and the natural spinal curvature is returned (**Figures 5 and 6**). For back pain of postural origin, the act of sitting up straight consistently through-

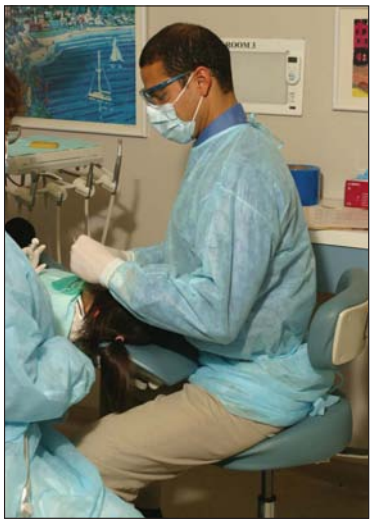

Figure 5. A balanced spine.

Figure 6. A balanced spine with back support.

out the working day and while driving, alleviates symptoms entirely.

As a dental health care practitioner, tuning into good posture, while adding a few general chairside exercises, may ease the day-to-day stiffness and discomfort experienced during a typical working day. While there is sparse support in the dental literature, at least one publication has identified the benefits of exercises performed by video display unit operators.[34,35] It was found that exercises performed while working at the video display resulted in short-term decreases in both musculoskeletal discomfort and postural immobility.[36] Another study found limited evidence based on randomized trials and epidemiological studies that exercises to strengthen back or abdominal muscles and to improve overall fitness, can decrease the incidence and duration of low back pain episodes.[37] So, where does one start? Family practitioner, orthopedist, chiropractor, physical therapist, massage, acupuncture? How about doing it yourself? Try the McKenzie approach.

McKenzie recommends self-treatment exercises under the following conditions:[15]

- Periods in the day when you have no pain
- Pain is confined to areas above the knee
- Symptoms are generally worse with sitting for prolonged periods and better with standing or walking
- Symptoms are worse with bending or stooping and with inactivity
- If symptoms are better with lying face down
- Several episodes of back/neck pain have been experienced over the past few years

As a general rule to follow for the McKenzie exercises: If pain does not centralize, decrease, or otherwise improve with the exercises; if pain was getting worse before starting the exercises and does not improve after the first two days; or if symptoms worsen following performance of the exercises and remain worse, seek advice from a medical doctor as this program may not be appropriate.[18]

As a first step, correct poor seated posture by way of a technique called "slouch-overcorrect." In this procedure, one assumes an extreme, slouched position. From this position one "rises" into an exaggerated, lordotic posture (**Figures 7 and 8**). One can repeat this procedure 10 times and then "reposition" oneself back into a good seated posture with appropriate lumbar lordosis. This can be repeated throughout the working day as a simple chairside exercise. Repeat the process eight to 10 times throughout the day. After completion of the slouch-overcorrect maneuver, make sure to resume the good seated posture. This is the key to ongoing success.

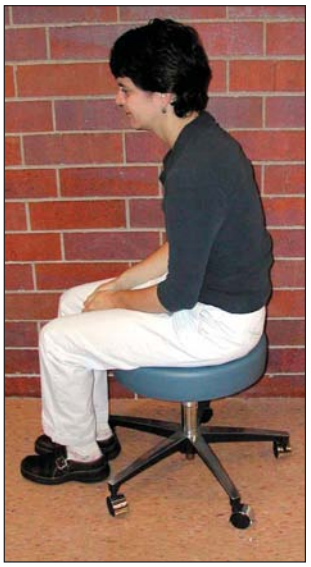

Figure 7. An extreme slouched posture.

Figure 8. An exaggerated lordotic posture.

Figure 9. Extension in standing.

Figure 10. Cervical retraction.

Extension in standing is another exercise used for counteracting poor postural habits. It requires one to stand with feet apart, shoulder width; placing hands in the small of your back or at the top of your buttocks; bending your trunk backward as far as possible while keeping the knees straight, and using the hands as a fulcrum (**Figure 9**). Repeat the process eight to 10 repetitions. This exercise can also be repeated four to six times throughout the day or as often as needed to counteract the stresses of forward flexion.

In the case of neck pain of postural origin, good seated posture is the first activity to master. One can choose from several other movements to perform. Included are neck flexion, extension, and retraction. Since cervical flexion and extension are quite common, retraction will be discussed. While sitting up straight, retraction consists of moving the head posteriorly on the neck and shoulders as if someone is pushing your face gently backward (**Figure 10**). The movement itself reverses the cervical lordosis and opens up the suboccipital space. A feeling of pulling or pressure in the cervical region at the end range of movement with no pain is normal. Retractions can be performed eight to 10 repetitions throughout the working day. The beauty of the postural syndrome is that the exercises to relieve it fit very neatly into the work day.

Even though the postural syndrome is an entity in its own, poor posture also plays a significant role in the next two syndromes described by McKenzie. The sitting posture of individuals identified with dysfunctions and derangements must also be addressed in order to effectively resolve their conditions.

Dysfunction Syndrome

McKenzie theorized that the dysfunction syndrome is thought to occur when structural changes affect the joint capsules or adjoining soft tissues. Pain is experienced when the end range of movement is attained in one or more directions. Analogous to the dysfunction syndrome is a Colle's fracture of the wrist. Once the cast is removed from the wrist, movement of the wrist causes the shortened soft tissues to stretch and produce pain. As movement improves, pain decreases. Dysfunctions can be described in a variety of ways such as shortened, contracted, adhered, scarred, or fibrosed. Dysfunctions result from poor posture, trauma or surgery and the lasting effect of imperfect healing. Dysfunctions are time dependent and take at least six to eight weeks after the onset of injury to develop.[18] The pain from dysfunction is intermittent in nature and felt locally, in the neck or low back regions without extremity symptoms. The symptoms from dysfunctions are only produced when the shortened tissues are placed on stretch, and cease when the loading has stopped or decreased. Additionally, movement of the spine will be limited in the direction of the pain. The pain one feels from dysfunction syndrome will persist until full range of motion of the spinal segments has been recovered, and remodeling of the affected soft tissue structures has been achieved.

In order to remodel a dysfunction, the soft tissues need to be stressed regularly throughout the day in order to return them to their normal resting length and full function. In dysfunction syndromes, the direction of movement in which this syndrome is treated is the one that causes discomfort. An initial pain that wears off gradually as you complete more repetitions is appropriate, whereas pain that is increasing with each repetition or moving distally is not, and one should stop the exercise. For example, if flexing forward causes discomfort confined to the back, without any symptoms into the buttocks or extremities, and improves as you increase the number of repetitions, then flexion in lying is the exercise of choice (**Figure 11**). Flexion in lying is performed while in a supine, hook lying position with the knees bent and the feet flat on the floor. Gently bring the knees up toward the chest until a feeling of pull or stretch is felt in the back. Repeat these exercises in sets of eight to 10 repetitions until the feeling of stretch subsides or until the knees reach the chest easily with no discomfort. Once the knees are brought to the chest easily, the progression is to flexion in sitting and standing.

Figure 11. Flexion in lying.

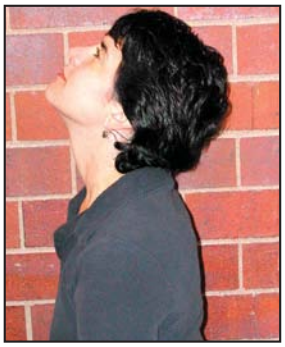

Figure 12. Extension of the neck.

In the cervical spine, if extension of the neck is limited and a feeling of pulling, stretching or pressure confined to the neck is felt with no other symptoms; extension in sitting is the exercise of choice (**Figure 12**). Extension in sitting consists of raising the chin upward while extending the neck. The head is extended back until a feeling of pulling, stretching or pressure in the neck is felt. Return to the starting position, rest and repeat eight to 10 times throughout the day. As the exercise progresses, range of movement will tend to improve with less feeling of pulling or pressure.

Several points of caution need to be made. It is known that the spinal discs hydrate during the night and that excessive flexion early in the morning may place individuals at risk for injury.[18] Snook et al. found that controlling lumbar spine flexion in the early morning was an effective form of self-care with potential for reducing nonspecific low back pain.[20] McKenzie recommended that flexion exercises always be followed by extension exercises, either extension in standing or lying (**Figure 13**). He theorized that performing extension after flexion could restore any distortion caused by flexion exercises. In the cervical spine, known pathology such as arthritic conditions, abnormal signs or symptoms, such as dizziness, disorientation or confusion with performing extension of the cervical spine is an absolute indication to stop and seek medical advice.

Derangement Syndrome

The second condition McKenzie described is the spinal derangement syndrome. As previously mentioned, self-treatment for individuals with derangements is ill-advised and potentially dangerous. This discussion of derangement syndrome is for informational purposes only in order to provide readers with a conservative alternative to be considered prior to undergoing a potential surgical procedure for pain of discogenic origin. According to McKenzie, spinal derangements are the most commonly seen clinical condition.[18] A displacement or disturbance in the normal resting position of a spinal motion segment is the cause of derangement. The disruption will be pain provoking until it is reduced. In regard to the spine, this disruption can be anywhere in the motion segment, which is defined as the vertebrae above and the vertebrae below including the disc and soft tissues associated with this joint. This disruption can lead to a loss of one or more movements in the cervical or lumbar regions with associated pain.

Derangements have varying clinical presentations, but usually respond to specific loading strategies. Symptoms can be felt locally in the spine, distally in the extremities or both. The hallmark of treating the derangement syndrome is called centralization. Centralization only occurs in derangements and is characterized by the identification of a movement that reduces the distal symptoms with a concomitant increase in local neck or back pain. With this decrease in symptoms, one will notice a dramatic, simultaneous increase in range of motion of the cervical or lumbar spine. The opposite occurs when a movement worsens symptoms or peripheralizes them into the extremities. Centralization includes the restoration of full movement with reduction or abolishment of symptoms.[18] For those facing a possible surgical intervention, this represents a reasonable treatment to try prior to undergoing more invasive treatments.

Clinically, the majority of patients with a derangement respond to the extension principle of movement, however the treatment strategy for derangements is based strictly on identifying a directional preference. In other words, directional preference is determined by identifying the direction that decreases, abolishes or centralizes the symptoms while simultaneously increasing the lost range of motion of the spine. Donelson et al. reported that directional preference is guided by centralization.[38] Long-term correction of this condition is also dependent upon eliminating poor postures, whether sitting, standing or lying, which can be a contributing or underlying causative factor in the persistence of this condition. Research has shown centralization to be a reliable indicator in determining which patients will have a good prognosis.[39-42] Eighty-seven percent of the patients who centralized had good or excellent outcomes when compared to those who did not centralize.[38] In the chronic back pain population, 47 percent centralized and of the group that did centralize, 68 percent returned to work versus 52 percent of the noncentralizing group.[42] Donelson et al. reported that centralization most often occurs with extension.[43] In the case of the "cen-

Continued on Page 155

Figure13a. Extension in standing.

Figure 13b. Extension in lying.

Continued from Page 152

tralization phenomenon" described by McKenzie, the pain can be a bit unnerving to individuals who may report feeling a worsening of their symptoms while experiencing it. A thorough explanation of symptom identification, understanding of potential pain behavior and location allows individuals to monitor and control their pain. Individuals must be assured that increasing central low back pain is desirable if distal, radicular symptoms in the arm or the leg are resolving or abolished. Once a treatment regimen has been established, ongoing postural education and awareness is a key ingredient to a successful treatment program.

Derangements can be summed up as a condition that is inconsistent and rapidly changing.[11,18] To support the concept of sitting in lordosis with the derangement population, Williams took patients with back and referred pain and divided them into two groups. One group was to sit in lordosis, and the other group was instructed to sit in kyphosis for 24 to 48 hours. The group that sat in lordosis had their back and leg pain significantly reduced versus the kyphotic group.[39] When experiencing symptoms consistent with the derangement or dysfunction syndromes, seeking professional guidance by an experienced practitioner initially during your care will assure a successful recovery. Having a complete McKenzie evaluation may allow one to more accurately direct one's own care and the return to pain-free, daily activities in a timely manner. With the McKenzie system, individuals beyond the scope of conservative treatment can often be identified within a reasonable number of visits (three to six), rather than an extended period of time. If successful conservative intervention cannot be achieved, individuals can be referred to the appropriate practitioner with a written report in order to make an educated decision about more invasive treatment options. In the cases where surgery is indicated, returning to a McKenzie-trained practitioner following a surgical procedure can facilitate a return to pain-free function.

Prevention

Prevention as a result of exercise has not been strongly supported in the literature, however; there is ample evidence that healthier, stronger individuals are at significantly less risk of health-related maladies including musculoskeletal disorders. One study has suggested that good dynamic trunk extension performance may protect against back-related permanent work disability.[44] Weakness of the spinal musculature in individuals with low back pain has been identified in the literature, and general poor health has been associated with back/neck pain in older individuals.[45] Spinal extensor musculature has been shown to have large potential for strength increase.[44] Medx is one particular treatment strategy utilizing a frame which specifically isolates the lumbar spine in order to strengthen back extensor musculature and has met with good results.[30] Lastly, the benefit of good working posture cannot be overstated. Poor seated posture may be a result of the combination of equipment choices and training.[46] (See Dr. Allan Jones article on Page 137.) Marklin noted that poor seated posture is quite prevalent among dentists and hygienists.[28] While the cause of poor seated posture is often difficult to pinpoint, several theories have been proposed including equipment selection, muscle weakness and debilitation, training techniques, work habits, workload, years in practice or some combination of these factors. Suffice to say, there is not one simple solution to this multifactorial problem. The addition of exercise alone to the dental health care worker's daily routine is only part of a complete solution. Several exercises have been recommended, however having a specific program customized for one's specific needs is the most appropriate approach to beginning an exercise program, particularly if there is underlying pathology. Having a complete musculoskeletal evaluation by a trained practitioner is a great place to start.

Choosing an ergonomically designed workspace and properly fitting equipment may further reduce the risk associated with some of these causative factors. Denis et al. found that EMG activity of dental hygienists' upper trapezius musculature was significantly reduced with the elbows supported by armrests on the operator

Table 1

NONSPECIFIC MECHANICAL SYNDROMES

SYNDROME	SYMPTOMS	STRENGTH	SPINAL RANGE OF MOTION	TREATMENT
Posture	Local, Intermittent	+/- weakness of trunk	No limitation	Postural correction General strengthening
Dysfunction	Local, Intermittent	+/- weakness of trunk	Limited, painful at end range	End range stretch in direction of pain throughout the day General strengthening
Derangement	Local/distal/both Radicular pain Possible sensory changes, motor deficits bowel/bladder symptoms	+/- weakness of trunk/ extremities	Limited, painful during range of movement and/or at end range	Rule out serious pathology with physician. Determine directional preference under trained practitioner. Exercises performed throughout the day Centralization

stools during the working day.[47] Reducing this type of stress is one part of the resolution. Looking at the layout of the clinic is a good place to start and analyzing the specifics of your dental practice. Answering the following questions may be informative:

- Is scheduling helping or hindering the work flow?
- Is needed equipment within easy reach while working with patients?
- Can you get close to the patient? Do you have them move to accommodate your needs?
- How is the lighting in the operatory? Do you use magnification? Does it help?
- Are you using fitted gloves of the appropriate size?
- Is your chair adjustable? Is it comfortable? Does it provide you the support to assume a good seated posture?
- Have you had your posture observed or have you observed others in your office? Are you able to take a small break between patients to perform a few simple exercises?
- Are you stressed during the day? Have you had to modify your work hours/techniques due to discomfort or pain?
- Take a picture of your seated work posture. What does it look like?

Being aware of the things we can control is extremely important. The concept of caring for our most important instrument, our body, is invaluable. Becoming aware of our aches, pains and general health is a vital part of attaining and maintaining a pain-free life. For years, dental health care workers have been constrained by the limitations of their own work environment and have paid the price physically. Equipment that does not work properly, adjust properly or limits lighting and visibility, along with increasing workloads, and poor ergonomic awareness and training, may all play a role. Fitting the worker to the work can have significant physical costs. Working with discomfort can only negatively impact the profitability of a dental practice. Likewise, career satisfaction, from quality of work to patient satisfaction, can also be greatly affected. It is often advantageous to have an objective third party perform a practice analysis to determine if the work environment is to blame for musculoskeletal aches and pains.

Conclusion

Given the numerous exercise routines and recommendations for treating back pain along with the countless health care practitioners available to seek advice from, it's always an advantage to be able to help yourself. There is an old proverb that goes something like this: "Feeding an individual a fish takes care of their hunger, while teaching them to fish allows them to survive for life." The benefit of having a custom-tailored home program based on your particular needs will allow you to be proactive with your back/neck pain. In most cases, "nipping it in the bud" before an annoying pain becomes more chronic and self-limiting is an obvious advantage.

The authors have attempted to summarize the characteristic symptoms of mechanical back/neck pain, along with providing a logical approach for seeking the most appropriate conservative care. As an ongoing treatment strategy, the McKenzie approach fits

very nicely into a regular workout routine and can be advanced to include a complete strength and conditioning program. McKenzie creates a framework within which one can perform all of their daily activities as well as their nightly activities safely, without pain. The ultimate success of the program combines the expertise of the trained health care practitioner including postural awareness, compliance of the patient and his/her self-treatment strategies. Making a conscious effort to include these components into daily and nightly activities will generally assure a much greater level of success. In general, being "tuned in" to how you feel will make a significant difference in your life, your staff, and in the lives of your patients. (**Table 1**).

Footnote: It is strongly encouraged you seek the advice of a trained health care provider when experiencing low back or neck pain prior to beginning any type of exercise program to rule out serious pathology. If experiencing symptoms consistent with dysfunction or derangement syndromes it is advised to have these evaluated under the guidance of a trained professional. CDA

References / **1.** Spratt KF, Lehmann TR, et al, A New Approach to the Low Back Physical Examination: Behavioral Assessment of Mechanical Signs. *Spine* 15: 96-102, 1990.

2. Kelsey JL, White AA, Epidemiology and Impact of Low Back Pain. *Spine* 5: 133-42, 1980.

3. Toroptsova N, Benevolenskaya L, et al, "Cross-Sectional" Study of Low Back Pain among Workers at an Industrial Enterprise in Russia. *Spine* 20: 328-32, 1995.

4. Croft PR, Macfarlane GJ, et al, Outcome of low back pain in general practice: a prospective study. *British Med J* 316: 1356-9, 1998.

5. Carey TS, Garrett JM, et al, Recurrence and care seeking after acute back pain. Results of a Long Term Follow-up Study. *Medical Care* 37: 157-64, 1999.

6. van den Hoogen, Koes BW, et al, On the Course of Low Back Pain in General Practice. A one-year follow up study. *Ann Rheumatol Disab* 57: 13-9, 1998.

7. Oberg T. et al, Musculoskeletal Complaints in Dental Hygiene: A Survey from a Swedish Country. *J Dent Hyg* 67(5): 257-61, 1993.

8. Murphy D. editor, *Ergonomics and the Dental Care Worker*. American Public Association, 1998.

9. Ariens, GAM, et al, Are Neck Flexion, Neck Rotation, and Sitting at Work Risk Factors for Neck Pain? Results of a Prospective Cohort Study. *Occupational Environmental Medicine* 58: 200-7, 2001.

10. Rundcrantz BL, *Pain and Discomfort in the Musculoskeletal System Among Dentists*. Lund Sweden: Department of Physical Therapy, University of Lund, 3-59, 1991.

11. McKenzie R, *The Lumbar Spine: Mechanical Diagnosis and Therapy*. Spinal Publications, 1981.

12. McKenzie R, *The Cervical and Thoracic Spine: Mechanical Diagnosis and Treatment*. Spinal Publications, 1990.

13. Spitzer WO, LeBlanc FE, et al, Scientific Approach to the Activity Assessment and Management of Activity-Related Spinal Disorders. *Spine* 12(7): S1-55. 1987

14. Delitto A, Erhard RE, Bowling RW, A Treatment-Based Classification Approach to Low Back Syndrome: Identifying and Staging Patients for Conservative Treatment. *Physical Therapy* 75: 470-89, 1995.

15. Nachemson A, Jonsson E, Jonsson editors. *Neck and Back Pain*. Lippincott, Williams and Wilkins, Philadelphia, 2000.

16. Bogduk N, Twoomey L, *Clinical Anatomy of the LumbarSpine*. Churchill Livingstone, New York, 1987.

17. McKenzie R, Kubey C, *Seven Steps to a Pain-Free Life: How to Rapidly Relieve Back and Neck Pain*. Plume/Penguin Publishing, New York, 2001.

18. McKenzie R, May S, *The Lumbar Spine: Mechanical Diagnosis and Therapy* 2nd edition Spinal Publications, 2003.

19. Solomonow M, et al, Biomechanics and Electromyography of a Common Idiopathic Low Back Disorder, *Spine* 28(12): 1235-48. 2003.

20. Snook SH, et al, The Reduction of Chronic Non-specific Low Back Pain through Control of Early Morning Lumbar Flexion, *Spine* 23: 2601-7, 1998.

21. Shah JS, Hampson W, Jayson M, The Distribution of Surface Strain in the Cadaveric Lumbar Spine. *J Bone Joint Surg* 60B: 246-51, 1978.

22. Sheppard J, Rand C, Knight G, et al, Patterns of Internal Disc Dynamic, Cadaver Motion Studies. *Orthopedic Transcripts* 14: 321, 1990.

23. Sheppard J, In vitro study of segmental motion in the lumbar spine. *J Bone Joint Surg* 77B(Suppl 2): 161, 1995

24. Edmondston SJ, Song S, MRI Evaluation of Lumbar Spine Flexion and Extension in Asymptomatic Individuals. *Man Therapy* 5: 158-64, 2000.

25. Andersson BJ, et al, The sitting posture: An electromyographic and discometric study. *Orthoped Clin N Am*, 6(1): 105-20, 1975.

26. Adams MA, Biomechanics of the Lumbar Motion Segment. In Grieve's Modern Manual Therapy. (2nd Ed). Eds. Boyling JD, Palastnaga N. Churchill Livingstone, Edinburgh, 1994.

27. Edwards WT, Ordway MS, Peak Stresses Observed in the Posterior Annulus. *Spine* 26: 1753-9, 2001.

28. Marklin R., Cherney K, Working Postures of Dentists and Dental Hygienists, in press.

29. Hickey DS, Hukins DWL, Relation between the Structure of the Annulus Fibrosis and the Function and Failure of the Intervertebral disc. *Spine* 5(2): 106, 1980.

30. Sini M, MEDX Clinical Data, Kerlin-Jobe/HealthSouth Clinic, Los Angeles, California.

31. Shirado O, et al, Trunk Muscle Strength during Concentric and Eccentric Contraction: A Comparison between Healthy Subjects in Patients with Chronic Low Back Pain. *J Spinal Dis* 5: 175-82, 1992.

32. Leggett S, et al, Restorative Exercise for Clinical Low Back Pain: A Prospective Two Center Study with One-Year Follow-up, *Spine* 24: 889-98, 1999.

33. Pynt J, et al, Seeking the Optimal Posture of the Seated Lumbar Spine. *Physiotherapy Theory and Practice* 17: 5-21, 2001.

34. Shugars D, Managing Dentistry's Physical Stresses: Chair Side Exercises for Dentists & Dental Auxiliaries. *NC Dent Rev* 2(2), 1984.

35. Valachi B, Valachi K, Preventing Musculoskeletal Disorders in Clinical Dentistry: Strategies to Address Mechanisms Leading to Musculoskeletal Disorders. *J Am Dent Assoc* 134, December 2003.

36. Fenety A, Short-Term Effects of Workstation Exercises on Musculoskeletal Discomfort and Postural Changes in Seated Video Display Unit Workers. *Physical Therapy* (82)6:578-89, 2002

37. Pollock M, et al, Effect of Resistance Training on Lumbar Extension Strength. *Am J Sports Med* 17(5), 1999.

38. Donelson R, Grant W, et al, Pain Response to Sagittal End-Range Spinal Motion: A Prospective, Randomized Multi-Centered Trial, *Spine* 16(6S): S206-S12, 1991.

39. Williams MM, Hawley JA, et al, A Comparison of the Effects of Two Sitting Postures on Back and Referred Pain, *Spine* 16(10): 1185-91, 1991.

40. Karas R, McIntosh G, et al, The Relationship between Non-organic Signs and Centralization of Symptoms in the Prediction of Return to Work for Patients with Low Back Pain. *Physical Therapy* 77(4): 354-60, 1997.

41. Long A. The centralization phenomenon. Its usefulness as a predictor of outcome in conservative treatment of chronic low back pain, *Spine* 20(23): 2513-21, 1995.

42. Sufka A, Hauger B, et al, Centralization of low back pain and perceived functional outcome. *JOSPT* 27: 205-12, 1998.

43. Donelson R, Murphy K, Silva G. Centralization phenomenon: its usefulness in evaluating and treating referred pain. *Spine* 15(3): 211-3, 1990.

44. Rissanen A. et al, Does Good Trunk Extensor Performance Protect Against Back Related Work Disability? *J Rehab Med* 34: 62-6, 2002.

45. Hartvigsen J, et al, Back and Neck Pain May Exhibit Many Common Features in Old Age: A Population-Based Study of 4486 Danish Twins 70-102 Years of Age. *Spine* 29: 576-80, 2004.

46. Jones A, et al, Functional Training for Dentistry: An Exercise Prescription for Dental Healthcare Personnel. In press.

47. Denis M, et al, Reducing Musculoskeletal Strain with the Use of Movable Elbow Supports in a Dental Clinic. Proceedings Article Self-ACE Conference — Ergonomics for Changing Work, 2001.

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