CHAPTER 7

METHODS TO MITIGATE HEADACHES – A YOUNG WOMAN'S SUCCESS STORY AFTER 11 YEARS

MUSCLE MISFIRING CAN PRODUCE A CHAIN REACTION HEADACHE

If a person's neck and shoulder headache-producing muscles always seem tight, a muscle misfiring pattern may be preventing the tense muscles from relaxing. The muscles may relax temporarily after

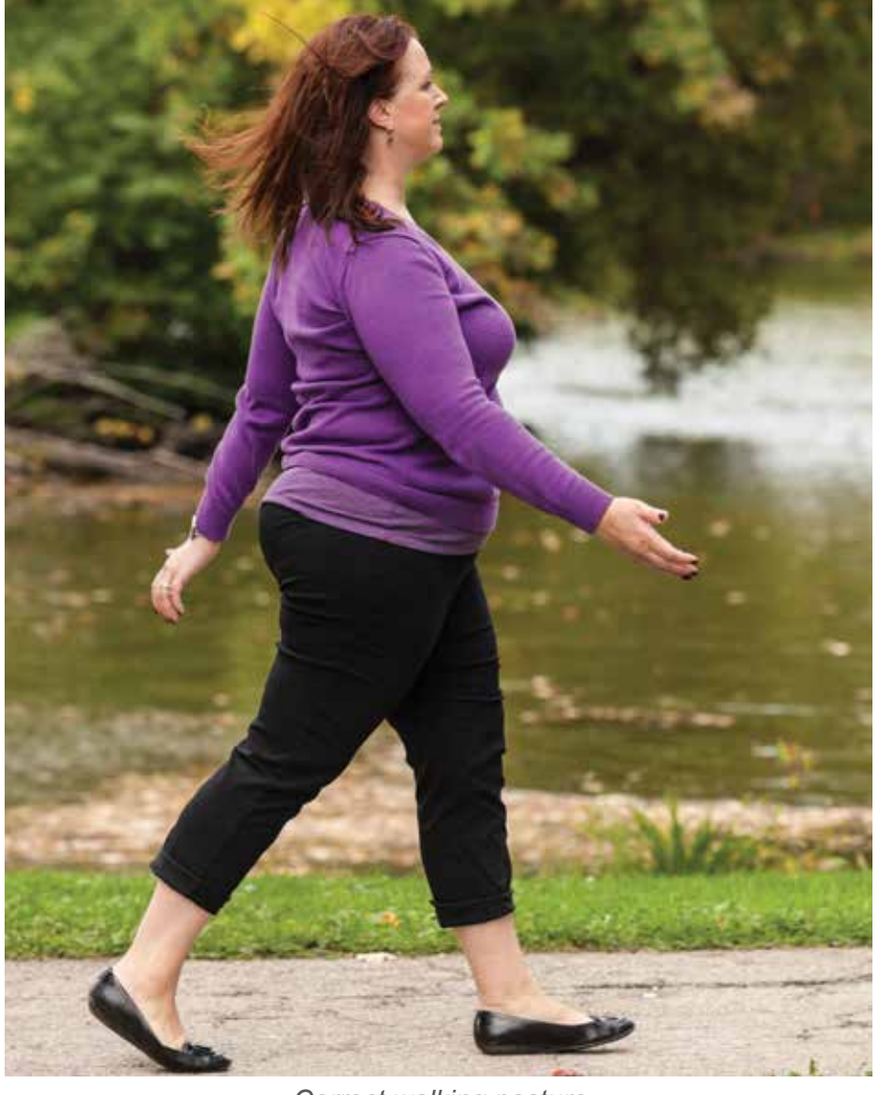
massage or stretching but then rapidly tighten back up again. This section explains why this tightening may be occurring and what can be done to stop it. The treatment for muscle misfiring is a bit complicated, which is why the case of a young woman, who had suffered with headaches since her teenage years shows how treating muscle misfiring can work quickly to relieve even longstanding headache problems.

Until they are tested in physical therapy, some headache sufferers are not even aware that their muscles are firing in the wrong order. When the muscles fire in the wrong order, muscle tightness results, which leads to headaches. The headache muscles remain tight and ready to contract at any provocation, which will set off yet another round of headaches. A normal muscle has some slack in it, so it can tense up without reaching that level of tightness that produces a headache. But when a muscle's starting tension level is already high, not much additional tension is needed to push it over the edge to trigger a muscle contraction headache.

When we move our bodies, there is a normal muscle firing pattern. One muscle fires first, followed by the second, third and so on. This progression creates a smooth and coordinated movement pattern that occurs thousands of times a day without people giving it a single thought.

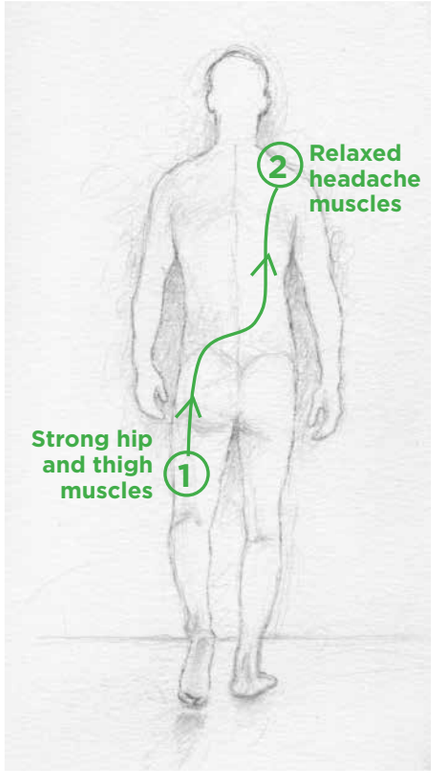
With some headache sufferers, the headache muscles in the shoulder blade and neck incorrectly fire first, when they should fire last in the muscle contraction sequence. Hunching your shoulders to initiate arm movement to reach for a coffee cup on a shelf is an example of muscle misfiring, because the movement should start with your lower arm muscles, not your shoulder girdle. Hunching your shoulder girdle can overwork two of the muscles notorious for causing headaches, the upper trapezius and sternocleidomastoid muscles, because they attach to both your head and your shoulder girdle.

Muscles in the lower half of the body also affect muscles in your shoulder and neck area. Misfiring muscles in your hips and legs, even though far removed from your neck and head, can still lead to headache muscle havoc due to repetitive strain during walking.

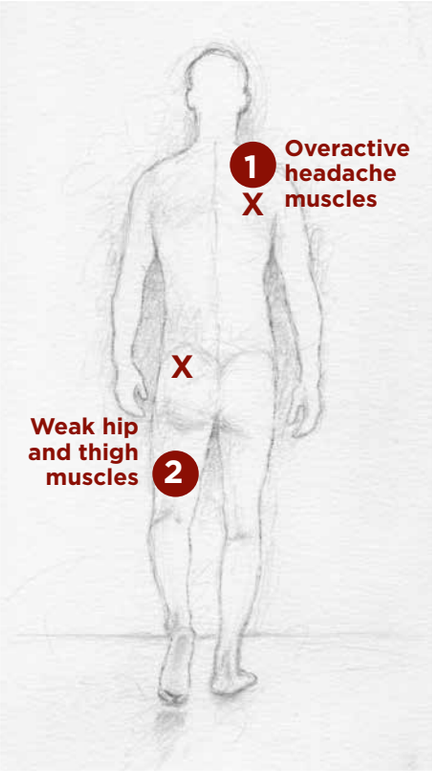


Correct walking posture

In a normal walking pattern, the shoulders are relaxed, with symmetrical contraction of the hip and leg muscles. As the left heel strikes the ground, the normal muscle firing sequence starts in the left thigh and hip muscles, then proceeds across the back to the right side of the trunk and passes up to the right shoulder and neck area. Feel how this muscular contraction wave crosses from left hip to the right side of your body by placing your hand on the right side of your trunk between the hip and the rib cage. Start walking, and just after your left heel strikes the ground, you will feel the muscle contraction build on the right side of your trunk as it moves up to your right shoulder and neck area.



Proper Muscle Sequence



Incorrect Muscle Sequence

Weak muscles in the left hip and leg can throw off the body's normal muscle firing sequence, causing a poor walking pattern. Consequently, the right neck and shoulder muscles can become tight as they try to compensate for this abnormal walking cycle. Over time, the right neck and shoulder blade muscles involuntarily fire before the left hip and leg muscles, as an attempt to "help" the weaker left hip and leg during the walking cycle.

Because of their poor walking pattern, some headache clients, who may get relief with relaxing treatments for their tight neck and shoulder muscles, find those muscles getting tight again by the time they walk out the clinic door. Their abnormal walking pattern was never corrected, which should have been done to really get to the root cause of their stubborn headaches.

ASHLEY'S HEADACHE HISTORY

This muscle misfiring concept is best explained by showing how it affected the life of Ashley, a 28-year-old woman who had been struggling with debilitating headaches for 11 years. If you have the same problem as Ashley, you will learn self-help treatment that can break you out of the headache cycle you may have had for years. In a doctoral case study, I described how correcting muscle misfiring helped relieve Ashley's long-term headaches. She continued to have relief of her headaches 25 months after starting physical therapy.

Ashley's neurologist had initially referred her to physical therapy. Ashley's history was very similar to many women struggling with persistent headaches. She reported her left-sided headaches began 11 years ago for no reason. She had been cleared of any obvious traumatic problems by imaging and physical examination of her neck and head.

Ashley's headaches started in the back part of her neck and traveled into the left temple and forehead. She reported her headache episodes would reach a considerable 8-9/10 on the standard 1-10 pain scale used by medical professionals. These severe headaches would last one to two days and occur two to three times a month. Every three months, she reported a breakthrough headache that would last six days accompanied with periodic nausea and vomiting.

Ashley stated she was hesitant to become pregnant, due to concerns about potential side effects that her headache medications could have on her baby. She had been treated with Lopressor (metaprolol) for five to six years as a preventative medication. Medications such as Eletriptan (relpax), Rizatriptan (maxalt) and Promethazine (compazine) had been taken as needed since high school.

ASHLEY'S UNSUCCESSFUL EFFORTS

She wore sunglasses to decrease the effect of the bright light that triggered her headaches. She had observed that certain food and beverages were headache triggers, such as red wine, which would give her a headache four to six hours later. The caffeine in coffee, which is a common trigger for many people with headaches, did not

make her headache worse. Stress, however, was a major trigger of her headaches, as is common with most people with migraines and tension headaches. One source of stress for Ashley was her job as a Corporate Manager. Unfortunately, her headaches increased the normal work stress level, and her stress-headache cycle became very difficult to break.

As with most headache sufferers, Ashley had tight and tender neck and shoulder blade muscles, with the main culprit being her tight upper trapezius muscle. This muscle straddles the head, neck, and upper shoulder. She needed a strategy to relax the upper trapezius to stop it from flaring up her headaches.

MUSCLE MISFIRING TREATMENT

A major cornerstone of Ashley's treatment came from concepts I learned from Vladamir Janda, a pioneering researcher of muscle physiology from Prague, Czechoslovakia. Janda's demonstration on how to restore normal muscle firing order was an important key to relieving Ashley's chronic headaches in just two weeks.

Follow these steps to check for muscle misfiring issues in your neck and shoulder muscles:

1. Lie flat on the floor, with a pillow under your stomach for more comfort if needed.
2. To feel your right shoulder blade muscles, cross your left arm across your chest and place your left hand on the right shoulder blade so that you can feel the right upper trapezius muscle.
3. Raise your left leg up just a few inches, since there will be a wave of muscle contractions passing from the left leg up towards the right shoulder blade and neck muscles.

Left hand monitors right shoulder muscle contractions

4. If your firing pattern is normal, you will not feel any muscle contractions in the right upper trapezius until the left leg has lifted off the floor.
5. Switch hand positions, so that the right hand is on the left shoulder blade and raise the right leg.

People who have a misfiring muscle pattern will feel an immediate contraction in the right upper trapezius between the neck and the shoulder as they try to raise the left leg. Other shoulder blade and neck muscles may be felt contracting as well. This abnormal right-sided shoulder muscle contraction will be strong and hard, occurring before the left leg even lifts off the floor.

When Ashley was instructed to lift her left leg off the table, she felt strong right upper shoulder and neck muscle contractions even before her opposite left hip muscle lifted her leg off the mat. Ashley's right shoulder blade and neck muscles contracted too early, prior to the firing of the left leg and hip muscles. Ashley was surprised and frustrated that when the command was given to raise the left leg, her right shoulder blade would contract automatically before the opposite left leg raised even one inch.

Right shoulder fire too early before the left hip muscle

There occurs a moment of realization that some of my clients have when they realize that their muscle "wiring system" is not working properly. Muscle misfiring can be compared to a car engine whose cylinders misfire and disrupt the smooth running of the vehicle.

A confirmation test to know if the muscles are truly misfiring is to see if there is weakness on one side of the body versus the other. Any unusual weakness in a healthy person is suspicious. If the strength on one side of the body checks out normal while the other is weak, the muscle firing problem can be a reason.

Your physical therapist can check the leg strength. The person with the headache lies flat on the floor, with a pillow under the stomach for comfort, and raises a leg upward a few inches. The physical therapist pushes down on the middle of the thigh to see if the leg collapses to the floor. The other leg is then tested in the same position to see if it is stronger. The physical therapist should be careful to not push too hard once a solid resistance is felt. Too much pressure can cause pain and strain to the low back. The person being tested should never feel pain.

Ashley clearly felt her left leg collapse as her weaker left hip and hamstring muscles could not provide the solid lifting power that the right-sided muscles could. The left hip and hamstrings muscles were the weak links in Ashley's muscular chain, and other links in the chain were called on to absorb the extra load the left hip and thigh were no longer bearing. In Ashley's case, those overloaded muscle links were in the right shoulder and neck muscles that produced her headaches.

Most people I find who have muscle misfiring tend to have spasm and tightness in their dominant right shoulder compared to the non-dominant left shoulder. The non-dominant left leg tests weaker than the dominant right leg. In right-hand dominant Ashley's case, her right hip and thigh strength were normal, and there was no abnormal contraction in the left neck and shoulder muscles. The diagonal between Ashley's right hip and left shoulder was normal, since the left shoulder blade stayed relaxed as the right hip and thigh muscles fired. It was the diagonal between the left hip and right shoulder that was not working properly. Until she was tested in physical therapy, Ashley had no idea her muscles were not firing in the normal sequence.

What could cause the muscle firing to be out of order? Hip weakness could throw off the normal firing pattern as the muscles farther up the chain struggle to compensate for the failure of the hip muscles to engage properly. The reason this problem could persist for years

without you being aware of its connection to your headache problem is that you really cannot feel a weak muscle. Since you do not feel any pain, no warning signal tells you that there is something wrong. The abnormal muscle firing pattern simply becomes part of your daily movement pattern unless intervention corrects the weakness and returns the firing sequence to normal.

In Ashley's case, even though the cause of the headaches was complicated, the corrective treatment works quickly. If you have the same problem as Ashley, you can shut down the improper muscle firing sequence with the following steps;

- Lie on your stomach as in the previous testing position, with your left arm across your chest. Pillows can be placed underneath the abdomen for comfort to avoid low back strain.
- Firmly grip your right upper trapezius with your left hand.
- Raise your left leg while monitoring the contraction of your right upper trapezius, and mentally tell it to not contract until after your left leg has lifted off the floor.
- Be patient, because at first simply trying to contract your left hip muscle can cause your right upper trapezius to prematurely contract before your left leg raises up.
- Over time, your upper trapezius can be retrained to stay quiet as your left hip begins to tighten more forcefully.

This training process can be frustrating at first, since getting rid of an abnormal reflex that has been present for years requires some effort. On the initial physical therapy session, Ashley had success with this technique in retraining her left hip muscles to fire properly *(Figure 1).*

Ashley maintained her left leg hip lift for one second. If she felt early contraction of her upper trapezius, she lowered her left leg onto the mat to avoid further reinforcement of the abnormal contraction. She had to "tell" her right upper trapezius to relax and not fire before her left leg was raised up. After numerous repetitions over approximately 15 minutes, she learned to mentally shut down the intensity of the too-early upper trapezius contraction. She was able to restore the normal

Figure 1 - Training the right shoulder muscle to relax

pattern of left leg contraction first, followed by right upper trapezius contraction. Her headache severity faded in minutes during the first session, as her right shoulder and neck muscles had strain removed from them.

Ashley's left hip lifting power also improved during that first session. The rapid increase in hip power meant that the muscle was not truly weak. She simply had "forgotten" how to use the hip muscle. Somehow the muscle had turned itself off and an abnormal muscle contraction pattern became ingrained. Ashley was told to be aware of this abnormal pattern while walking, since the right upper trapezius and other muscles were likely contracting prior the left heel striking the ground.

"THE SHEET STRETCH" FOR NECK AND SHOULDER MUSCLES

Ashley's treatment to help break up the abnormal firing pattern also involved stretching tight muscle groups, which may have been tight for months or years. The tight upper trapezius muscle of the neck and shoulder, for instance, becomes re-wired to sense that its abnormal tightness is its new normal, and so it never returns to a relaxed state. Therefore, Janda felt retraining could not be complete unless normal muscle flexibility was restored.

For treatment, Ashley stretched her upper trapezius and other muscles by sitting on a sheet to anchor it, wrapping the sheet across her right shoulder girdle, and then crossing the sheet to wrap underneath the opposite left thigh *(Figure 2).* The slack in the sheet is taken up by picking the left leg up as if it was preparing to march *(Figure3)*. Then she tilted her head to the left and applied downward pressure of the leg *(Figure 4)*. To add extra stretch, simply move the left leg out to the side to increase the tension on the upper trapezius and other neck muscles *(Figure 5).*

Figure 2

Figure 3

Figure 4

Figure 5

The reason this stretch works so well and is more comfortable is that it avoids tension on your neck. The stretch coming from the bottom of your neck moving up is smoother and more relaxing than grabbing the top of your head and pulling it from the top down. Spread the sheet out onto your shoulder for comfort. *If the sheet applies pressure to the nerves coming out of your neck, stop the exercise if any tingling or numbness is felt in your arm or hand.* This sheet stretch technique is meant to feel like a relaxing massage as it gently stretches out the tense muscles in the shoulder and neck that are hard to reach.

Turning your head left and right will stretch various headache generating muscles by pressing your shoulder girdle area downward. Keep your neck and head in a straight line *(Figure 6-8).* If the stretch does not feel relaxing, switch to another technique.

Figure 6

Figure 7

Figure 8

Ashley was seen initially for six visits over four months. By her third visit on day 15 she reported that her headache pain was now “the best it had been in years.” After the fourth visit on day 36, Ashley had been medication-free for weeks with no return of headaches. Neck turning was normal and motor firing patterns were in the proper sequence after being retrained. She also noted in the meantime that she had been placed in a high-stress situation which did not produce her usual breakout headache pain.

By her fifth visit on day 55, all headache medication had been discontinued. By the sixth visit on day 101, the headache relief was still maintained at 0/10. Eleven months after starting physical therapy treatment for her severe headaches, Ashley had a headache-free pregnancy and gave birth to a healthy beautiful baby girl.

JANDA’S RESEARCH

Janda believed that most practitioners only treated muscle tension in a small area, neglecting global muscle imbalances as they related to the whole body.[1] Individual muscles need to be studied to determine how they perform in an organized group.[2] Muscle imbalances can develop in the pelvic region and progress upwards, based on EMG studies.[3-4] A delay in the firing of the seat muscle, or gluteus maximus, in injured people can cause muscle dysfunction in muscles far away from the gluteus maximus.[5]

In a case similar to Ashley’s, Janda noted, in an EMG study of a 55-year old woman suffering from a chronic neck injury, that the upper trapezius muscles had excessive activation due to dysfunctional gluteal muscle firing. Every step the woman took overstressed the neck area, and improvement occurred after the patient was retrained to decrease upper trapezius over-activity.[6]

In summary, the treatment principles to correct muscle misfiring are stretching tight muscles, strengthening muscles that have shut down and retraining a person to fire their muscles in a normal sequence so that the problem muscle firing pattern does not return.[7]

ADDITIONAL TREATMENTS USED FOR ASHLEY

ACUPRESSURE

After the improved muscle firing technique on the first day of therapy, the headache reduced to 1/10. This dull ache totally disappeared with use of an acupressure point in the web space between the thumb and forefinger. Pressure is applied to this Large Intestine 4 point to a person’s pain tolerance for 10 to 30 seconds.

This acupressure treatment was not used as the first treatment intervention for Ashley, because the pain relief from acupressure would have left the underlying cause of the abnormal muscle firing undiscovered. When seeking the best headache remedy, one should not try too many treatments at once, because then there is no way to determine which treatment worked and which were unnecessary. Acupressure’s role in Ashley’s headache management was to calm mild to moderate headaches when the prone lying leg lift technique was not convenient to do.

Acupressure point in the web space between the thumb and forefinger

MENTRUAL CRAMP RELIEF

Ashley came in on her fourth visit with a mild 1-2/10 headache and was having some menstrual cramping on that day. As noted earlier menstrual cramps and headaches are frequently intertwined. Acupressure points on the top of her foot were used to get rid of Ashley's headache and menstrual cramping. These points are found in the web space between the second and third toes and are named Stomach 43 and 44. These points relieve abdominal cramping according to Chinese texts.[8]

Stomach 44

Stomach 43

FOOD AND ENVIRONMENTAL TRIGGERS

Ashley was aware of her food sensitivity to red wine. However, one afternoon she went out to eat with her sister and mother at an Asian stir-fry restaurant. The following day all three of them had raging headaches. While it was uncertain what additive triggered the reaction, monosodium glutamate has been identified as a dietary culprit. Genetics clearly contributed to these headaches, so people should pay attention to what triggers affect their relatives.

The reaction to food sensitivities seems to occur between four hours up to one day after ingesting the offending food or drink. A 12 to18 hour delay from eating to reaction time is common as Ashley's unfortunate culinary experience demonstrated. There was no sign of trouble at the time, which is why all headache sufferers should keep a food diary, and then rate the headache intensity day by day. Over time, a pattern may emerge, and people can look back and see what they ate or drank on a day before their throbbing headache started.

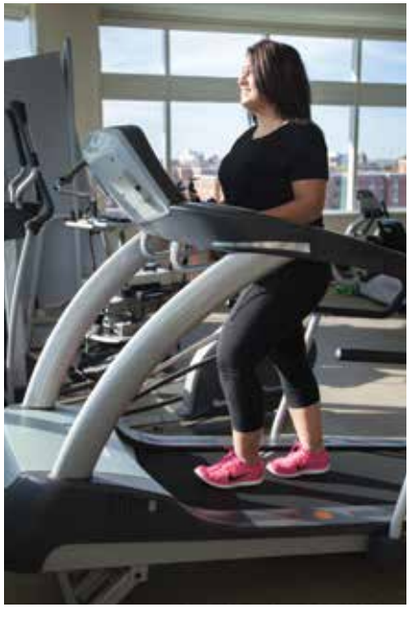
By keeping track of what her environmental triggers were, Ashley determined that paint fumes was a potential trigger, as they are

for many people. To reduce paint fume exposure, consider using a respirator mask, or only paint outdoors. Ashley also realized that the fluorescent lights in her bathroom could have triggered her headaches, and that switching to more gentle LED lights could be helpful.

AEROBIC EXERCISE

Ashley noted that aerobic activity reduced her headaches. On her second visit, Ashley was placed on a treadmill to assess the effect of aerobic exercise on her headache.[9] She was started at 15 degrees elevation at a slower 2.0 miles an hour rather than trying a faster running regimen on a level track. A significant 15-degree incline will give people an excellent cardiovascular workout and yet avoid the sharp impact from the heel striking the treadmill track that comes from running on a level surface. Less impact pressure is transmitted through the spine, which may be appreciated even up as far up as the neck. Additional benefits to working out on an incline are that the abdominal and gluteal muscles work harder, and the calf muscles get stretched more than they do on a level surface.

Caution! Make sure you have no shortness of breath while on the treadmill!



You should be able to talk comfortably while exercising and be ready to slow the treadmill down if you are winded while speaking. Monitor your heart rate! Count the heart rate for 15 seconds and multiply by four, or 20 seconds and multiply by three to get the heart rate per minute. You should learn how to accurately determine your own heart rate. Do not rely entirely on the machine monitor which can measure too low and give a false sense of security. If you have a heart arrhythmia, many machine monitors will not notify you of skipped heartbeats.

ISOMETRIC EXERCISE FOR NECK AND ABDOMINAL MUSCLES

Neck isometric contraction

Neck isometric contraction exercises, while sitting, leaning into a rubber ball helped Ashley relieve a mild headache. This exercise works postural muscles in both the front and back of the neck. Breathe out as the neck pushes into the ball, and then breathe in as the neck relaxes. The neck must stay in straight alignment, with the eyes looking neither up or down. Caution is needed to avoid overloading the neck muscles. Stop if even a twinge of pain occurs in the neck.

Ashley added a “plank” exercise to her program to increase her core abdominal strength and to work the left gluteal muscles at the same time. Core and abdominal strengthening exercises can be useful to decrease pressure on the neck muscles. This plank exercise also works other muscles in the thighs and trunk. Lying on the floor with a pillow under her hips, Ashley put her calves on a chair or sofa. She raised her hips off the pillow in two seconds, held the position for five seconds and lowered her hips back down on the mat for two seconds.

Plank starting position

Plank ending position

Do not overarch the back during the lift-off phase. Absolutely no pain should be felt. To add challenge and interest to this plank exercise, put your legs on a large exercise ball instead of the stationary chair or sofa.

As Ashley concluded her physical therapy, she was set up to do this exercise at home once every two weeks for 15-minute sessions. An excellent study in the journal *Spine* indicates that the spinal muscles can maintain strength just by exercising once every two weeks![10] However, if you do not keep up with even this minimum frequency of exercise, muscle strength will drop off rapidly in a month or two.

MEDICATION REACTION

Ashley returned to physical therapy 21 months after her initial session with increasing severity and frequency of her headaches. Motor recruitment patterns were still normal. However, she had begun taking 100 mg daily of Effexor (Venlafaxine) three months after childbirth to help cope with high job stress. The headaches started coming back shortly after Effexor was started and the intensity peaked six months later. She was immediately referred to her physician to see if these headaches were a side effect from the medication.[11]

Ashley's headaches reduced over several weeks as she was weaned off the Effexor by her physician. No one should ever try to self-medicate, as medications can have drastic side effects if started or stopped too abruptly. A medical doctor must be supervising the medication regimen.

LASTING BENEFITS OF TREATMENT

At her 25-month recheck, Ashley reported the headaches were still gone. She only needed to keep up with her exercise program once or twice a week to keep her headaches from coming back. After years of struggle, Ashley had a specific custom-made program that worked for her.

Ashley's muscle misfiring problem contributed to her headaches. People should check to see if their headaches might be a result of this condition. Unfortunately, people live for years with this problem without realizing that correcting the firing patterns can provide immediate and long-lasting relief.

Six years after treating Ashley for her chronic headaches, I contacted her to review the chapter discussing her story. Not only had she kept her headaches under control, she had also added another child to her family, with a third on the way.

Her successful outcome illustrates that the length of time one has had headaches, in this case 11 years, does not make prevailing over headache pain any less likely. Headaches from other causes will also respond to the physical therapy treatments quickly and mercifully.

CHAPTER 8

SUMMARIZING SOLUTIONS - NEXT STEPS

DON'T ENDURE YOUR HEADACHE EPISODES

The concept for the title of this book of calming the headache storm comes from the Biblical book of Matthew, chapter 8, where Jesus Christ calms a storm on the Sea of Galilee.

To calm your own headache storm, start with detective work by keeping a headache diary for several months to collect specific information about how your headache behaves. Do not simply endure your headache episodes, but step back and objectively look at what factors brought on the headache in the first place. You can use a calendar to record some basic information needed to make it easier to identify your triggers. When you can identify some of your triggers, the treatments you need to use will fall into place.

Record your headache pain on the calendar or diary by rating it every day on a scale of 1 to 10, even breaking down your pain rating into morning and evening levels. Another key factor to record is your level of stress each day. Write down the number of hours that you sleep on a given day, because sleep quality is a major cause of headaches. Record your diet in the morning and afternoon. Remember there is a delay from the time of a meal until a chemical reaction appears as a headache. Many people do not have these food triggers, but if you do have a food sensitivity, removing the offending item is an easy fix. Also, be aware of the effect of exercise, heat and cold on your headache.

You likely will identify with one or more of the headache types discussed in this book. The cervicogenic, tension and migraine headaches all can last for days or even weeks in some cases. Any type of headache may be sensitive to light, though the migraine variety of headache tends to be the most sensitive. The lines between the headache categories are not always clearly defined, and many people have several different types of headaches blended together. Some of my clients can even tell which type of headache they are dealing with on a given day, as the characteristic of the pain is different. Neck pain and stiffness may accompany any of type of headache.

Sorting through the headache scenarios can be a daunting task, but you do not need to go through this process alone. Physicians and physical therapists who have genuine interest in helping people with headaches can provide you with many useful suggestions. The treatment of headaches is a specialized field, and you might benefit from finding a medical professional who has a passion for this problem. A physical therapist can help you select the treatments best suited

to your headache. Your headache may not go away completely, but usually you can get it to subside from an aggravating intensity to a dull ache. *Remember, if your pain continues or increases, stop these exercises and call your doctor or healthcare provider.*

In courses that I have taught, I note that it takes time and practice for people to become skilled in their ability to use the techniques on themselves. Acupressure points, for instance, may be difficult to locate at first, but once you know where to find them, you can feel the headache melt as you apply the pressure. Pressing the trigger points on the sternocleidomastoid muscle also frequently shuts down a headache in seconds, and many of my clients are happy to trade in their over-the-counter pain pills for more rapidly working natural remedies.

Your headache characteristics and triggers are unique, and your self-help treatment plan will also be slightly different from everyone else's. Most people can find their own natural headache "shutoff switch" to stop their headaches from escalating out of control, whether it is muscle trigger or acupressure points, stretching of certain muscles, or conditioning exercises to develop control and endurance in the neck muscles. Cognitive strategies to keep your mental stress at low levels are useful as long-term solutions.

The beauty of self-help treatments is that once you become familiar with them, you can continue using them for years. Headaches often fade away on their own accord as the years pass by, but do you really want to wait out the years when you have excellent options for taking care of yourself?

It is my sincere wish that you succeed in your efforts to have a more abundant life not dragged down with headache pain!

Craig Sather

Doctor of Physical Therapy,
Certified Mechanical Diagnosis
and Therapy Practitioner