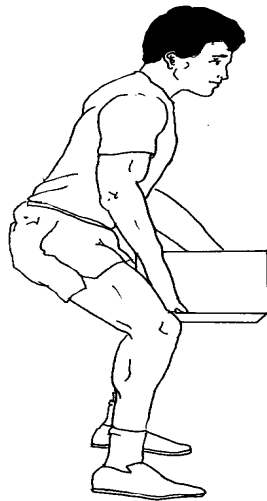


The Duffy Rath System[®]

A Blueprint for Musculoskeletal Wellness and Injury Prevention



Program Orientation and Core Concept Manual



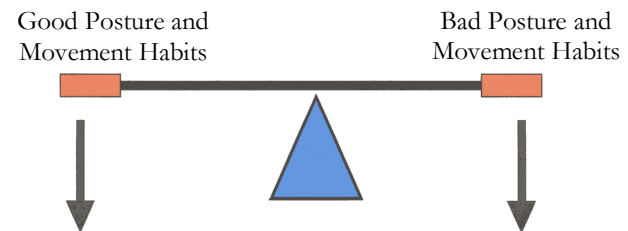
Our mission is the prevention of musculoskeletal and lifestyle-related disorders and disability through education, training and research.

About the Duffy-Rath System[®]

Our goal is to help you keep your back, shoulders, wrists and other body regions healthy. This booklet will begin to teach you how to do that by introducing you to our 'Blueprint for Musculoskeletal Wellness and Injury Prevention'. Then one of our physical therapists will be onsite a few hours each week to help you apply the blueprint.

Muscle and joint problems may occur after an accident, but they can also develop gradually from the way we do things day in and day out. The second type has **warning signals** before they develop - fatigue, stiffness or discomfort, even numbness and tingling can be a warning. For example, have you ever sat cross legged too long and your leg fell asleep? That is a warning signal not to sit like that!

You can prevent warning signals from turning into a bigger problem by using our **Tools To Fight Back[®]** - simple things you can do to fight back against the daily stress and strain of your work and home activities. For example, your back will be more protected if you learn how to sit, stand and lift in good posture instead of in poor, slouched or bent posture. Less stress will build up on your wrists and hands if you take micro-pauses from repetitive work. Balance is the key and we will help you find the balance you need to stay healthy!



While we are teaching you how to take better care of your bodies, we will also work with your company to help reduce ergonomic risk in the workplace.

Definitions:

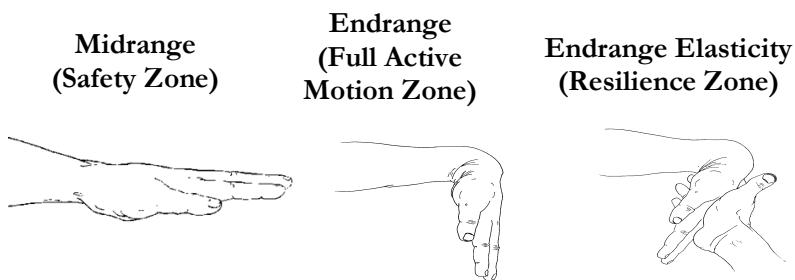
Musculoskeletal System: the moving partssystem of the body (muscles, bones, joints, nerves, discs, etc.).

Range of Motion (ROM): the amount of normal movement in each joint of the body. Important classifications of ROM are:

Midrange: when a joint is in the middle of its motion and nothing is being stretched. Working in midrange reduces stress on your body, especially during more difficult tasks. Midrange can also be called your **'Safety Zone'**.

Endrange: when a joint is at the end of its active motion in one direction and the opposite side is stretched. Endrange is needed for full movement, but staying there too long or repeating it too often without interruption may lead to problems.

Endrange Elasticity: a joint with full, healthy ROM has a little elasticity or resilience after endrange. Bend your wrist and then gently push it a little more in the same direction to feel this. This 'resilience zone' helps prevent injury. With proper guidelines, adding a little gentle overpressure at endrange helps to maintain this resilience, or to stretch out tightness that has developed from poor postural habits, or from the healing of a previous injury.



Ergonomics: is the science of designing work to fit the human and not the other way around. The goals are to improve comfort, increase efficiency and prevent musculoskeletal disorders and injuries.

What Normal Movement Should Feel Like: flexibility varies, but the sensation everyone feels when moving through a full range of motion should be similar. In midrange you should not feel any sensation (with one exception explained below). At endrange you will feel stretch or strain, which increases as you add overpressure and move into the elastic zone after endrange. Stretch a joint too far and you will immediately feel pain - a clear warning to stop. Stay at end range too long, or repeat it too often without interruption, and you will eventually feel warning signals telling you to interrupt what you are doing more often.

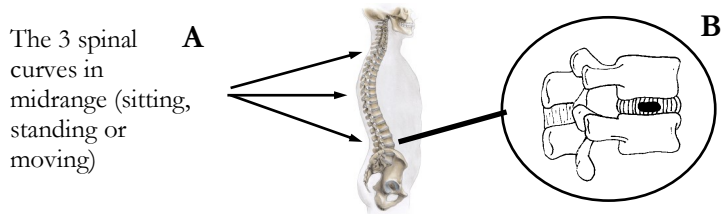
Muscle Effort Sensations: Muscles fatigue quickly if an activity involves excessive weight or effort. Fatigue from low level effort is gradual and less obvious. Muscle fatigue may even occur when you are midrange if it takes effort to hold the joints in midrange. Fatigue is a warning to find an easier way to do the task, or to interrupt it more often, or to increase your strength and endurance. If you don't interrupt muscle fatigue, the stress may build up and eventually you may develop a problem in the muscles and tendons.

5 Core Elements of The Duffy-Rath System® Blueprint:

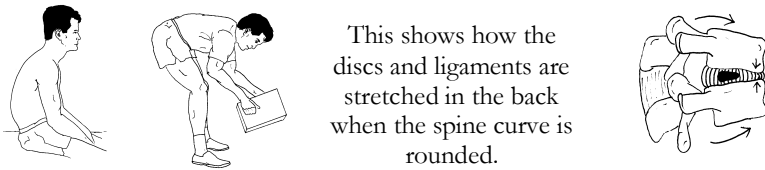
1. **Good Posture and Body Mechanics:** this protects and provides stability by using your joints in midrange. We call this Protective Work and Home Habits.
2. **Managing Fatigue and Stress:** using micro-pauses and the 'Opposite Movement Rule' to offset tasks like lifting, reaching, gripping, sitting and standing; and to prevent or reduce fatigue.
3. **Good Range of Motion:** having enough motion in your joints and flexibility in your muscles to meet your physical demands at work, home and play with a large midrange or safety zone.
4. **Adequate Strength and Fitness:** having enough strength and endurance to meet your physical demands at work, home and play with an extra margin for safety.
5. **Positive Attitude:** possessing the skills and having confidence that you can manage your musculoskeletal wellbeing.

Body Regions

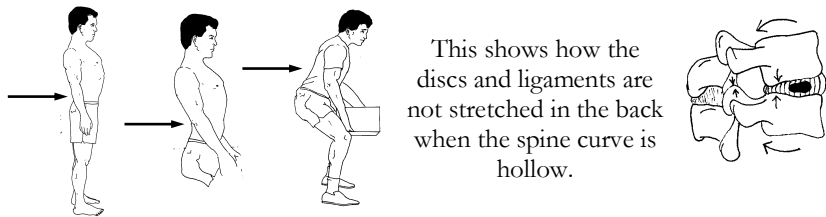
The Spine: is a series of bones connected by muscles, ligaments and discs with 3 curves (A) for flexibility and shock absorption. The spine is midrange when the 3 curves are present. Between each vertebrae is a disc with a gel-like center (B) that aids in shock absorption.



Most of us round our backs 1,000's of times every day which may eventually weaken the muscles, ligaments and discs on the back side of the spine.



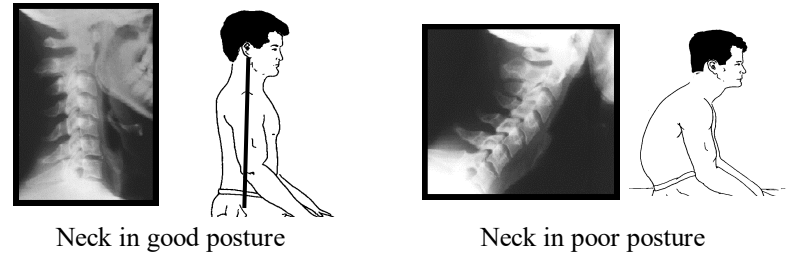
Midrange protects the spine, but because it takes effort to keep your spine midrange, most people don't do it. Maybe that's why 80% of us have a back pain episode at some point in our lives! Endurance improves with practice, but use support in the hollow of your back when sitting for long periods.



Spine Range Of Motion: If you sit and stand slouched a lot then as you age the front of the body will adapt and shorten making it harder to stand up straight, and you may gradually lose your ability to bend backwards.

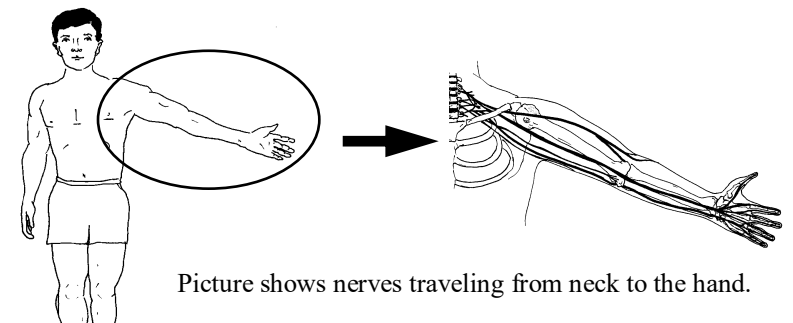
The Neck: is midrange when the ear, shoulder and hip are in a straight line. When the upper back is rounded the neck pokes forward, the joints are not lined up, and the muscles in the front and back of the neck are out of balance. There is more stress on your neck and upper back when you turn or look up from this position.

Neck Range of Motion: constant slouching with rounded shoulders and your neck poked forward causes the front of your neck and chest to gradually tighten up so that eventually it is more difficult to pull your neck back and to sit or stand tall in good alignment.

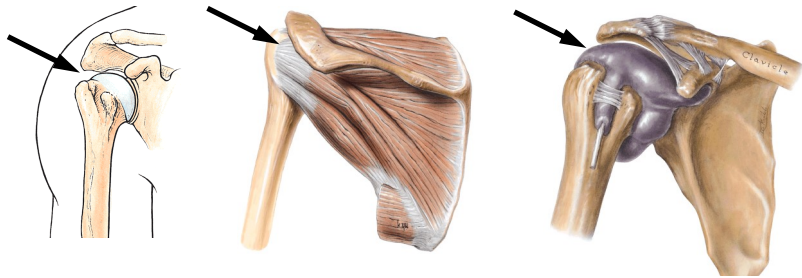


Relationship of the Neck to the Arm: Muscles help attach your shoulder to the neck and upper back, so using your hands with your arms elevated or reaching adds stress to them. The nerves to the arms and hands begin in the neck so neck posture may affect how you feel in your arms and hands. When your neck is poked forward and your upper back is rounded there is more stress on the nerves. Improving posture helps prevent problems in your arms, wrists, hands and fingers as well as in your neck and upper back.

Range of Motion: the nerve tunnels may become tight from constant slouching and seldom moving in the opposite direction.



The shoulder: is midrange when your chest is up and your elbow is down. The space between the ball of the shoulder and the bone above it (arrows below) is where many shoulder problems occur. This space is reduced when your shoulders are rounded or your elbow is up and then the tendons that pass through may be pinched and blood flow reduced. With the chest up and shoulders back, the ball sits low and back in the socket which increases this space.



Elbow too high



Rounded shoulders,
reaching too far

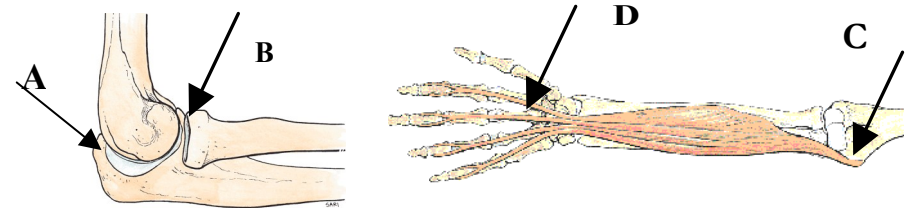


Midrange shoulders

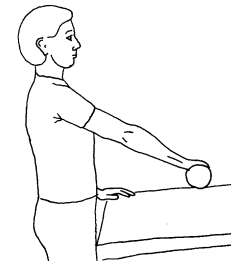
To protect your shoulders; work with your chest up, shoulders back, and arms close to your body. Lift with two hands whenever possible. Avoid sustained, repeated or heavy overhead work. Avoid pulling from behind or with an outstretched arm.

Shoulder Range of Motion: if you are constantly slouched with rounded shoulders then over time the front of your chest and shoulders will tighten and you will gradually lose the ability to sit and stand tall and to raise your arms fully overhead. It is important to maintain this range of motion for full function and to prevent injury throughout your life.

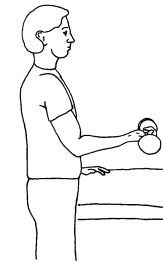
The Elbow: The main elbow joint (A) bends and straightens. A smaller joint (B) rotates the forearm up and down. The elbow and forearm are midrange when they are about half way between bent and straight with the hands facing each other (handshake position). The muscles for gripping and grasping start at the elbow (C) and end in the wrist and hand (D).



To protect the elbow and forearm keep your work close, your arms midrange, and vary the arm muscles you use throughout the day. For example, lifting with your hand down and elbow straight uses the smaller forearm muscles more, while lifting from underneath with your elbows bent lets the larger and stronger biceps help. Use 2 hands to lift whenever possible.

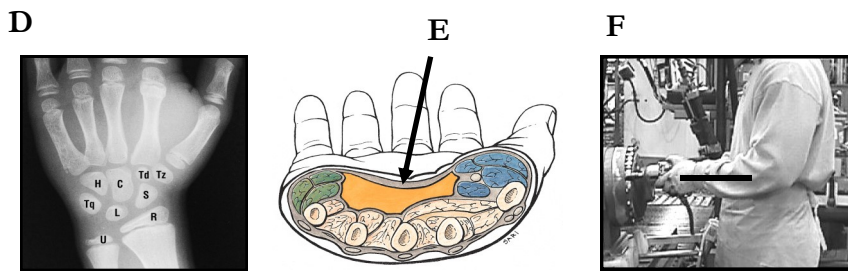


Try to do less lifting with one hand and your forearm turned down and arm away from your body.



Try to lift with 2 hands facing each other, elbows close to your body. If your hand is turned up your biceps can help more with the lift.

The Wrist: is formed by 2 forearm bones and 2 rows of small carpal bones (D) that allow it to bend up and down and side to side. Nerves, blood vessels and tendons pass through the carpal tunnel on their way to the hand (E). Use your wrist in midrange (F) and interrupt gripping and hand use, especially if awkward, heavy or repetitive. The muscles that move the wrist and hand start at the elbow and forearm so they must work harder when your hands are far away from your body.



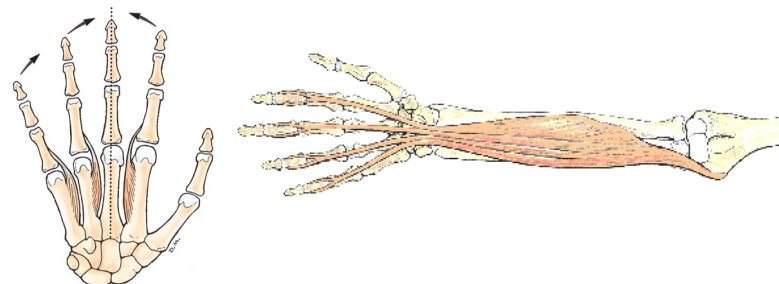
Try not to use your wrists bent too far up down or to one side. Don't pinch with 1 hand to lift objects - instead use a 2 hand power grip. Try to keep elbows close to your body. Take frequent micro-pauses when using hands repetitively.



Pictures show wrist too bent and risky 1 hand pinching to lift heavy object.

Elbow, Wrist and Hand Range of Motion: the palm side of the elbow, forearm, wrist and hand - especially the gripping muscles - will tighten up if you don't stretch them in opposite directions. You should stretch the joints and muscles on both sides, but especially those on the palm side. This will help you to prevent elbow, wrist and hand stiffness and discomfort as well as loss of range of motion and function as you age.

The Fingers: bend, straighten and spread open and closed. The thumb has a lot of movement and rotates to face the palm. Some of the muscles that move the fingers start at the forearm and elbow. Their tendons are long and run on the front and back of the fingers and thumb. If there is too much repetitive or awkward gripping and pinching, especially with too much weight, the muscles will fatigue and eventually the tendons may become irritated. The muscles must work harder when your hands are used too far away from your body.



To protect the fingers and thumbs, keep your wrists midrange, not bent too far up, down or to one side. Use a two hand power grip to lift, not one hand pinch grip. Work with your elbows close to your body. Take frequent micro-pauses when gripping and grasping.

Finger Range of Motion: with all the gripping and grasping we do the fingers are more often bent than straight. Therefore we tend to lose motion in the straightening direction as we age if we do not stretch regularly in that direction.

Tools To Fight Back®

The Legs: are designed for power and stability. Their muscles are the largest and strongest in the body. They provide power to walk, run, climb, squat, lift, push, pull and carry. The leg muscles act like a pump, helping to return blood from the foot and lower leg back to the heart and lungs. When you are not moving, this pumping action is reduced so standing or sitting still for a long time can make your legs and feet uncomfortable and stiff.

To help keep your legs comfortable while standing, change your position frequently or march in place, try alternating one leg up on something stable, and keep your feet comfortably apart. Don't twist on a planted foot or stand with all your weight on one foot. Many knee and ankle problems are caused by trips, twists and falls, so watch where you step. The best opposite movement for the legs when sitting is to get up and move around a little! Keep your legs strong by following the squatting advice on page 15.



The first 2 pictures show alternating one foot up or marching in place to interrupt standing. The 3rd shows someone twisting on a planted foot which adds more stress to your hips, knees and ankles. Instead, pick your feet up to turn so that your knee points in the same direction as the rest of your body, especially if you are holding weight.

A Tool to Fight Back® is a movement, activity or habit that offsets the stress of work and home activities. It may be taking a walk at your break if your job involves sitting all day. Or taking a micro-pause to shake your arms out and move in the opposite direction of what you were doing. Working to improve your posture and body mechanics is also a good Tool To Fight Back®.

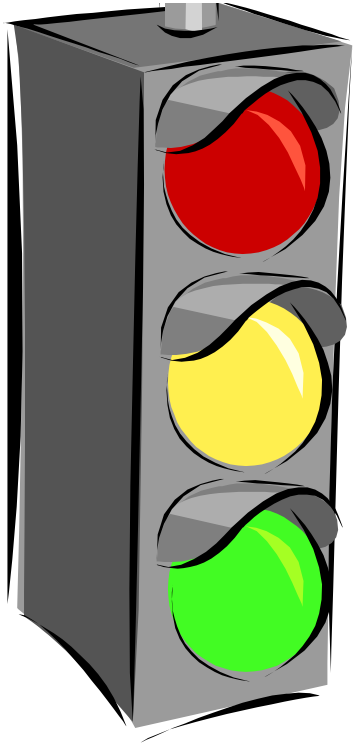
After these 2 pages are some Tools To Fight Back® that are good for almost everyone, regardless of occupation. They help improve posture, and fight the most common positions, movements and postures. But sometimes a job involves other movements and positions so look at the task you are doing and move your body in different or opposite directions!

Guidelines and Precautions

- If you have a muscle, joint or nerve disorder or a medical condition, consult your physician before beginning.
- Don't start without proper training.
- Follow proper technique and don't rush.
- Start with a small amount of movement and go a little further each time as comfort permits.
- Don't push through the stretch or strain sensation and don't hold at endrange.
- If you are unsure ask for help.
- Do 3-5 repetitions, but you can do more if it feels good.
- Don't let being busy stop you, even one movement can be good, especially if done frequently throughout the day!

The Traffic Light Tool

If you have no discomfort before, during or after a movement then you have a green light to continue. Use the following as a guide when you do have discomfort, stiffness, soreness or other warning signals.



Red Light

(Stop and get advice)

- You have discomfort and it worsens each time you do a movement
- Or, it does not go away when you stop
- Or, the location spreads
- and, the movement is not getting easier as you repeat it

Yellow Light

(Continue carefully, don't push it)

- You have discomfort but it does not increase each time you do a movement
- Or, the location does not spread
- Or, you don't have discomfort until end-range and it stops as soon as you release (probably tight from lack of movement in that direction or from previous injury)

Green Light

(Go! Do this movement often)

- You have no discomfort, or if you do it gets less or goes away as you repeat a movement
- The movement is getting easier to do

It is not a Tool To Fight Back® unless it works and helps you to feel more comfortable!

If you have not found anything that helps after following the advice in this book, then talk to the physical therapist when he or she is onsite.

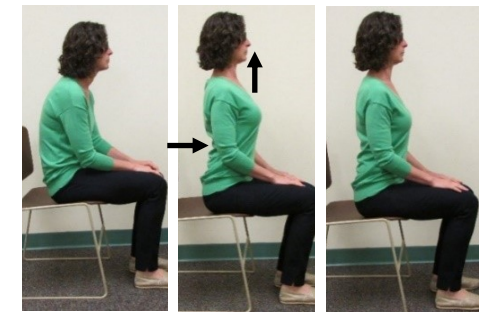
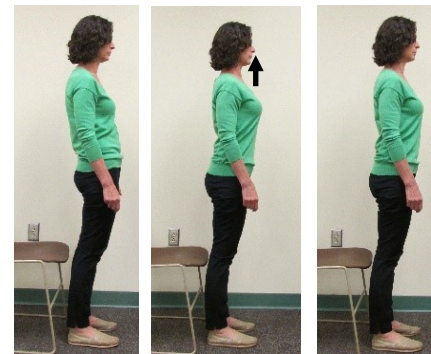
Tools To Fight Back®

Good Posture in Standing and Sitting

Do these to improve your habit and endurance for good posture because it will protect your spine and because the spine is the foundation for all movement. Do them also to interrupt prolonged standing or sitting and to prevent or relieve warning signals anywhere in the back or neck, sometimes even in the arms or legs.

Standing: lift your chest, pull your hips back and pull your stomach in a little. Relax back down and repeat, lifting a little higher each time as comfort permits. The last time you lift up, release only about 10-15% from your tallest position or until the strain is gone. Practice holding this good posture. Start with a few minutes and increase as comfortable until you can hold it for 30-60 minutes without fatigue.

Sitting: lift your chest, increase your low back hollow and roll your pelvis forward a little. Relax back down and repeat, lifting a little higher each time as comfort permits. The last time you lift up release only about 10-15% from your tallest position or until the strain is gone. Practice holding this good posture. Start with a few minutes and increase as comfortable until you can hold it for 30-60 minutes without fatigue.



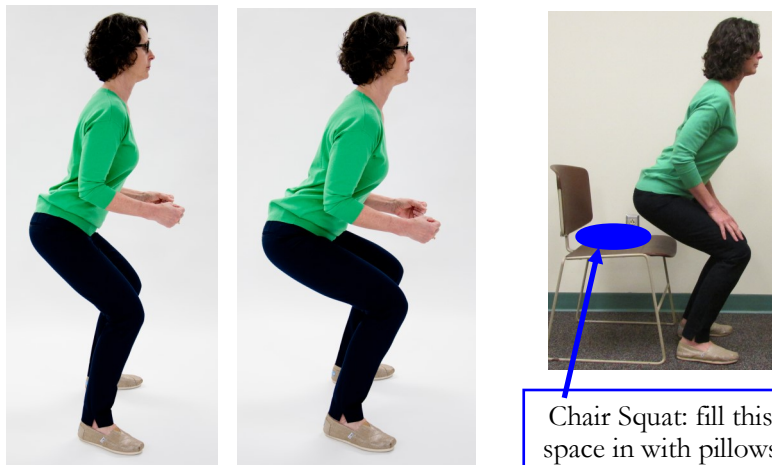
Tools To Fight Back®

Good Posture while Moving and Lifting

Use this to improve bending and lifting habits. Squatting protects your back, neck and shoulders by keeping them in their midrange safety zone and by getting you closer to what you are lifting. Squatting strengthens your legs and can be used to interrupt prolonged standing. If you have knee problems get advice before starting. In the long run strengthening the muscles around your knees will protect them too—but it must be done properly!

Start your squat by standing tall in good posture, feet shoulder width apart and slightly turned out. Then squat down a little by bending at the hips and knees. Look straight ahead, keep your chest up, your low back hollow, heels on the ground and knees behind your toes. Rise back up without leaning forward. Repeat, going down a little further as comfortable.

If this is too hard start with chair squats. Chair squats are the same motion but a chair behind you helps guide your technique. You can place pillows on the chair or hold onto a table in front of you to make it easier; just be sure you maintain good technique. Then gradually progress to regular squats as it gets easier.



Squatting exercise to develop good lifting habit and strengthen legs.

Chair Squat: fill this space in with pillows if it is too hard to squat at first.

Tools To Fight Back®

Shoulder Blade and Neck Retraction

These put your upper back and neck in midrange and create more space for the tendons in your shoulder. They help keep you flexible across the front of your shoulders and chest. Use them also to interrupt activities that cause you to round your shoulders and poke your head and neck forward.

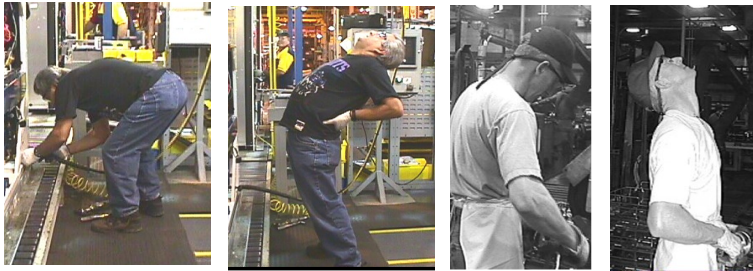
Start in good posture, then lift your chest and pull your shoulders back and down while squeezing your shoulder blades together a little. Don't lead with your elbows, instead keep your elbows in line with your shoulders. Return to the start position and repeat going a little further each time as comfort permits.

Next, keep your chest up and pull your head and neck back a little, (don't tilt chin up or down). Return to the start position and repeat, going a little further each time as comfort permits. You can use your fingers to guide the movement. After you have done it a few times and are getting a green light you can use your finger to add a gentle push into your elastic zone.



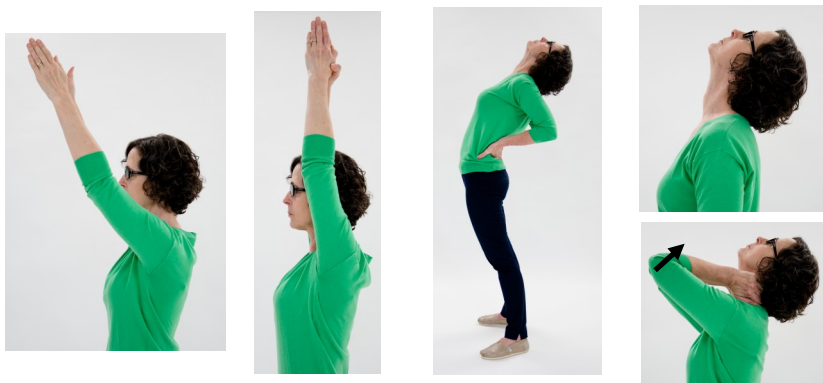
More Tools To Fight Back®

One of the most effective Tools To Fight Back® is the **Opposite Movement Rule**. First correct back to midrange, then move the body region in the opposite direction of how you were using it. The pictures below illustrate good opposite movements to offset bending, reaching, lifting, pushing, sitting, and any task that rounds your back, neck or shoulders.

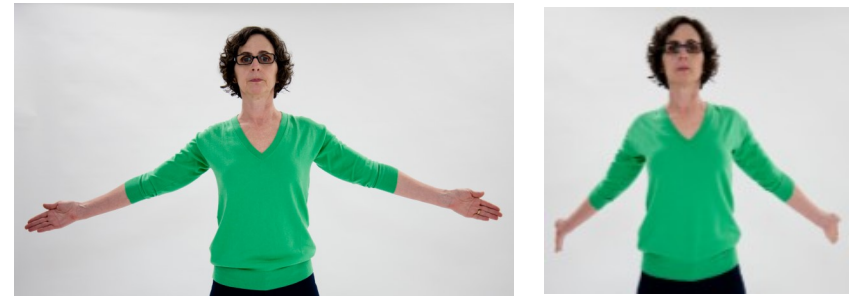


2 people using opposite movements to offset bending.

Overhead Arm Raise, Neck and Back Extension: Start with a small range of motion and increase as comfortable. Stand tall, chest up, feet shoulder width apart and stomach in. 1) Raise arms without leaning back or poking head forward. Keep elbows straight and arms close to your body—even if it means you don't go as high. 2) Stay tall and place hands in the small of your back, now bend backwards up and over your hands. 3) Stand tall again, with chest up and then lift your chin to bend your head and neck backward. Use your hands for support if its more comfortable (but be sure to raise your elbows and chest as you bend your neck backwards).



General Opposite Arm Movement: Start in good posture with your chest up and arms by your side, palms facing forward and fingers straight. Now raise your arms about half way to shoulder height and then move them behind you a little. Return to the start position and repeat going a little further each time as comfortable. This is a good general opposite movement for reaching, gripping and grasping, and any activity where your shoulders are rounded and your elbows, wrists and fingers bent.



Although it is good to maintain range of motion in this direction, it is not good to combine this direction of movement with a forceful exertion. For example, reaching into the back seat of your car to lift a heavy bag. Or, pulling something heavy with your arm stretched back behind you or out to the side as in the picture below. Instead, try to have your hands in front and your elbows close to your side.



Opposite Movements for Gripping and Other Hand Use:

These help maintain flexibility of the muscles and tendons that pass through the carpal tunnel, and that you use to grip, grasp and pinch. They are also opposite to how we commonly use our wrists and forearms (faced down). Take micro-pauses and do these to interrupt gripping, grasping, pinching, manipulating objects, using hand tools, typing, mousing, texting, pushing buttons, operating levers and controls, or any repetitive hand use.

Start by standing tall and gently shaking your hands out to loosen things up and stimulate circulation. Now spread your fingers open a few times. Then with your elbow bent and by your side, palm up and fingers straight, gently bend your wrist down toward the floor. If this is comfortable, straighten your elbow and bend the wrist down again. If that is comfortable and you have a green light you may stretch the movement a little further with your other hand. Keep your fingers straight as you do this. If you are still getting a green light then a full stretch into the elastic zone is done by turning your forearm out and applying a little more stretch. Remember to only do this as comfort permits or if it feels good! Don't push through a yellow or red light!



Stretching the Wrist Stabilizer Muscles: This helps maintain flexibility of the muscles on the top side of the wrist and forearm. These muscles hold the wrist steady so you can grip with more power and less stress. When muscles are more flexible they handle stress better. This is another good way to warm up for and to interrupt repetitive or forceful use of your wrists and hands.

Start by standing tall and gently shaking your hands out to loosen things up and stimulate circulation. Now with your elbow bent and by your side, palm down, gently bend your wrist down toward the floor. If this is comfortable straighten your elbow and bend your wrist down again. If you are still getting a green light then stretch the movement a little further with your other hand and lastly, repeat it with your fingers bent a little and as you turn your forearm in a little. Just remember not to add more stretch until the previous amount feels good. Don't push through a yellow or red light!



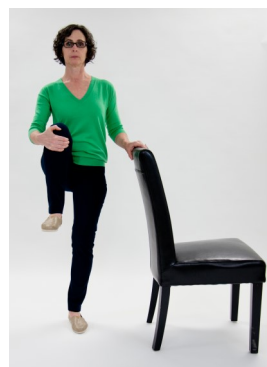
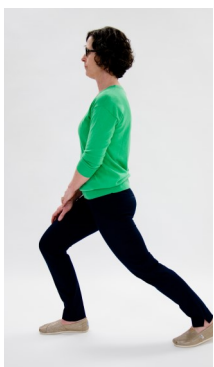
Leg Opposite Movements: your legs may get stiff when in the same position for a while and tight leg muscles make it harder to maintain good spine posture. Leg movement helps circulation, so it is good to interrupt standing and sitting with leg movement.

When you sit, your hips and knees are bent, so just standing and walking is a great opposite movement and it gets the leg muscles pumping to improve circulation. If you absolutely can't get up, at least alternate straightening and bending your knees, flex your ankles up and down and make circles with them.

When you stand, your hips and knees are straight and the lack of movement reduces the positive effect that leg muscle contraction has on circulation. Walking or sitting helps offset static standing. If you can't do either then try opposite movements pictured below.

The first 2 are good for both sitting and standing but the third one is better for standing (your hips and knees are already bent in sitting).

1. Stand tall, chest up, with one foot in front in a wide stance. Now lunge forward a little on the front foot with your chest up and your knee behind your toes. Allow your back heel to come up to stretch the front of your hip and keep it down to stretch your calf. 2. Put your foot out in front and lift your forefoot up while keeping your heel down to stretch your calf. 3. Bend your hip and knee up, holding something for balance as needed. The picture shows it with the hand gently pulling it up a little higher, but start with just marching in place a few times before doing that and only if it feels good (green light).



Summary

The Duffy-Rath System® helps you fight back against stress and strain to keep your body healthy. The goal of this booklet and your first workshop is to give you a Blueprint that will help you:

1. Identify poor posture and movement habits at work and home and then improve these habits.
2. Increase your endurance for holding midrange posture and positions.
3. Begin to use the Opposite Movement Rule by practicing the Tools To Fight Back® described in this booklet.
4. React quickly to risk factors and warning signals with effective Tools To Fight Back®.

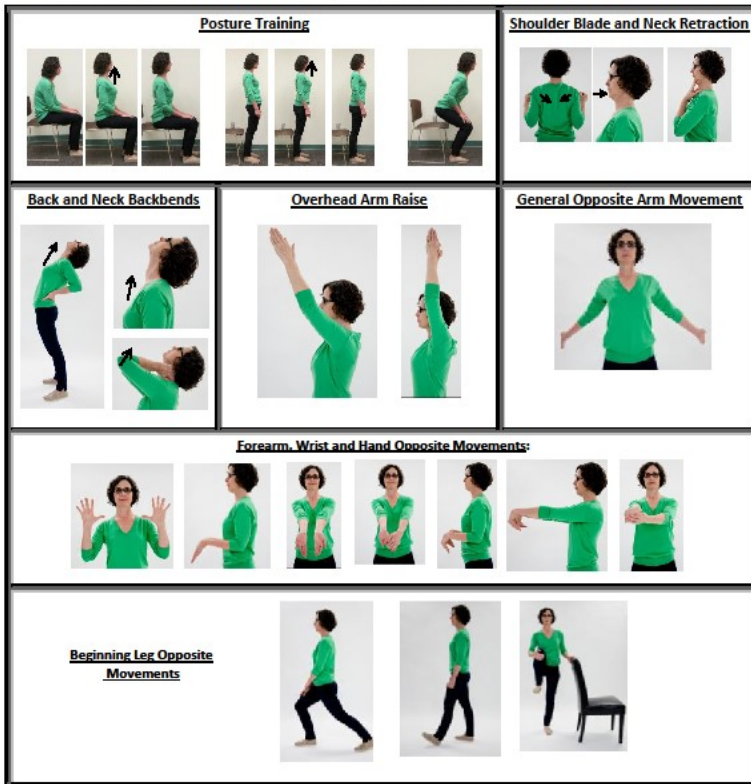
Next, one of our physical therapists will be available to help you apply what you have learned. This will be done in your work area and during future Tool Box Talks and in other ways. The goals are to provide more Tools you need to:

- 1 Apply the basic concepts to your specific work and home activities.
- 2 Learn more Protective Work and Home Habits, Micro-pauses, and Opposite Movements for all body regions and for a variety of tasks and activities.
- 3 Maintain or restore your range of motion in all directions.
- 4 Maintain or increase your strength, endurance, balance and stability.
- 5 Build confidence in your ability to take care of yourself and prevent injury.

We look forward to working with you!

The Duffy-Rath System® at Huhtamaki Goodyear - Your First Tools To Fight Back®

These postures and movements help you keep your body well and prevent fatigue, discomfort, stiffness and other warning signals. Follow the guidelines in your booklet. Start easily and go a little further as comfortable for 3 to 10 repetitions. Do twice daily or more to interrupt work and home tasks. Stop any movement that is painful and get advice from your Program Leader. Discuss with your first doctor if you have a condition.



Practice these and other prevention movements with videos found at www.duffyrath.com



For more information about how to prevent musculoskeletal disorders and remain active and physically able through your working years into retirement contact us – we want to share our expertise and help you become your own expert!

WWW.DUFFYRATH.COM