

## Chapter 4 - A&P Basics To Know By Second Grade

### Wow, I Do All That?

For just a moment of reflecting on this spectacular physical vessel we, as spiritual beings reside in on this physical plane, the systems that coordinate in us are:

**Integumentary System** - skin, hair and nails for protection, temperature regulation, sensory reception, excretion, metabolic functions and blood reservoir;

**Skeletal System** - bones and joints for support, protection, movement, manufacturing and storage of blood and storing minerals;

**Muscular System** - muscles, attachments and connective tissue for movement, heat production, maintaining body temperature, maintaining posture and stabilizing joints;

**Nervous System** - central (brain, spinal cord) control for controlling sensory, integrative and motor functions and peripheral nerves;

**Endocrine System** - hormones and glands for regulating and maintaining homeostasis;

**Reproductive System** - genitalia for genetic sex, reproduction, fetal development and puberty;

**Cardiovascular System** - heart, blood and blood vessels for pumping and carrying blood;

**Lymphatic System** - lymphatic vessels and organs regulate body fluid compartments and immunity;

**Respiratory System** - upper (nose, sinus, throat), lower (voice, windpipe and lungs) for respiration and gas exchange;

**Digestive System** - oral cavity, pharynx, esophagus, stomach, small intestine, large intestine, for digestion to absorption to elimination, and beginnings of metabolism; salivary glands, liver,

gallbladder and pancreas are accessory digestive organs that help digest food via chemical enzymes;

**Urinary System** - kidneys, bladder, elimination of waste products, regulates blood chemistry, blood volume and blood pressure;

The proper term for these systems maintaining harmony and perfect balance is "homeostasis."

Imagine all that is going on and how we usually are not cognizant of the minute-to-minute details until we have a problem. Depending on our status of health in a moment, not drinking enough water can be a huge impact on the body. Stress can be a huge impact on the body. We inhabit a miraculous living machine and when we provide the best for our living vessel in every way it can then provide for us greater quality and longevity of life.

### Bones Don't Hold Us Together

When I was young I used to think of the skeleton like a frame holding together the body. While it appears that way, like a lot of things in life, appearances are deceiving. Muscle and connective tissue actually hold the bones in position, and of course the skin keeps us wrapped in a nice little package. The skin, which is our biggest organ! See what I mean about appearances? If you watch some cable programs about the archaeological digs of mummies, they're digging up individual bones and then putting them all together to examine "the skeleton" as that person (or creature) was thought to have existed in its lifetime.

Our bones are connected bone to bone by ligaments. Our muscles are connected to bones by way of tendons. This means that we have the belly of a muscle, a musculo-tendinous junction where the muscle tissue joins with the tendon tissue which connects to the bone. There is a

little known fact that there are receptor cells in the tendons called the "Golgi Tendon Organ". These receptor cells in the tendons, when massaged, help the muscle relax. So when we massage you, we make sure to get around the bones as well. Our bones are actually designed in shape, and size to have the muscles attach to them. Most of our muscles are named for the particular locations on the bones they are attached to.

Ligaments and tendons are made up of connective tissue. Fascia that surrounds muscle tissue is also made up of connective tissue. Multiple layers of connective tissue make up incredibly strong structures and layers that hold us together much like an internal skin. Connective tissue is the most abundant tissue in the body. When we are cold, connective tissue becomes hard and when we are warmed up in either internal or external heat and have ample water supply, connective tissue softens to the point we therapists call melting.

Again, fascia, made up of connective tissue, that "internal skin" surrounds every muscle fiber, every muscle bundle, every muscle in its entirety, every group of muscles, region of muscles and regions of the body. Connective tissue is not contractile like muscle tissue, but it does stretch. Half my job as a massage therapist is to warm the tissues of the body so muscles can relax. Meaning more specifically, muscle tissue has to have its surrounding fascia warmed sufficiently for it to release its over-contracted state.

The best way for me to describe fascia, even though we can all feel what it feels like when part of us is tight, is like a nylon stocking that we try to put on too fast. If we put our hosiery on improperly, or it snags to create a pull in one area it is not going to fit right in the other areas. (I know guys, you can think of putting on stockings too.) We have to straighten it out and put it on in a gradual even manner to get the right fit. Fascia that is too tight is like the stocking that won't go on properly, because it's pulled directionally or wound up somewhere.

Another analogy would be putting on a cotton shirt that is several sizes too small. The fabric at a particular point reaches its max and stops giving and that's it, you cannot get it fitting properly or stretch more. Forcing it, or forcing muscles to stretch is asking for trouble.

## **Heat Melts Connective Tissue**

Our fascia, like the stocking or shirt, actually helps hold tight muscles in their contracted state until enough heat is produced either internally or externally to soften the fascia so that the muscle can stretch properly. Making this job a bit more difficult after trauma or injury is the fact that connective tissue is not well vascularized, meaning, it has little blood supply. Unlike the bones which manufacture and store our blood, and heal very quickly, these connective tissue structures need much more time to heal.

It's vitally important to understand this and warm in order to properly stretch or if not warmed properly, tight muscles will most likely stay contracted. If worked when cold, as in going out to do activities when not properly warmed and stretched, in other words not prepared to do a particular job, injuries are far more likely to occur. Sometimes we're unwittingly just asking for injury.

I worked on a man who came to vacation in Maui who had just gotten off a jet ski with a muscle pull in his back ribs. How much do you stretch I asked him? Never was the reply. We can learn from others' mistakes.

*\*\*\*Heat is necessary to melt connective tissue! This is the only way to release muscles in an over-contracted state. We need to stretch, and we need to be warm when we stretch. And we need to stretch before AND after exercising. A little dancing is a great way to warm up before stretching. And for those living in cold climates, take extra care in keeping warm for stretching and exercise.*

One of the greatest recommendations for any

of us is the hot tub or jacuzzi. Long sessions of heat is the "magic bullet" in my opinion to get those deep core muscles and structures that massage doesn't even get to. Of course we need to cool throughout our sessions submerged in heat with cool showers and drinking water. Several hours in heat, then cooling, more heat, then cooling, etc. is an excellent remedy to release our deepest core muscles when we are not able to exercise to create the necessary internal heat. The heat allows the melting and the stretch and the cooling can help prevent that muscle memory from returning to the over contracted state. When we dip in baths of heat and cold alternately like this it is referred to as "sitz baths".

## **What Happens When We Don't Water The Plant**

Again, that other factor that keeps fascia supple, (like all other tissue in the body) is water. Water is the number one health and beauty secret in the world. Ask any supermodel. Every day of our lives we are anywhere from 72% to 96% water. We all know what happens when we don't water the plant. Proper hydration is not only the strength of our musculature but enhances every system, action, function, and cell of our body. We often mistake our thirst for hunger and go eat instead. We do get water from our food but enough pure water is a must for optimum efficiency particularly those of us who are very active, work outdoors, hard labor or live in very hot climates where we lose a lot of water through perspiration.

Remember my experience early one morning with the chiropractor who examined me first by way of muscle testing which I failed completely? After hydrating she did my testing again and I had sufficient strength after which I said, "Wow, how did you know I was dehydrated?" She replied "Well, it's a pretty good indication when all your systems fail that you're dehydrated."

Think about the plant!

When I asked my Mom and Dad or even one of my teachers recently if they drank their quota of water they each said, "Oh my god, that's so much water, I'd be peeing all day and all night!"

Well, if you didn't catch it at the beginning of the chapter, I'll point out that the urinary system regulates blood pressure, chemistry and volume. Think about that one!

We should all understand that peeing plenty is necessary and purposeful and positive and an all-important function of our bodies! Look again at all our systems that need this basic substance for functioning and then understand that every cell in every system is creating waste material that also gets processed and flushed or perspired out of our skin via water. Our skin! Our biggest organ, which perspires every second, billions of cellular exchanges every minute.

My experience tells me most of us get too little water. I challenge everyone to do the test and get your optimum quota. I can tell a big difference in how I feel in my musculature when I make certain to get my last quart in each and every day. Fully hydrated I feel less tension, more fluid, supple and strong, and my skin looks awesome.

## **Our Daily Quota**

I always thought I remembered from junior high phys ed coaches, my health studies and nutrition classes and research two years ago when I started this book project that our advised quota of water is a gallon per day but apparently since 1989 there's been much controversy over how much water is enough. University studies and the USDA today still advise over a gallon per day, or 3.7 liters for men, and a bit under a gallon or 2.7 liters for women. But it says it will vary for our age, size, daily activities, the climate where we live, and the state of our health.

So let's go with a gallon for a moment because I want you to think about this in a new way.

A gallon is eight 16-oz glasses which = 120 ounces per day. That's 4 quarts or 3.5 liters. Which, when you think about it, it's only 7.5 ounces of water per hour for 16 hours of our waking day. I'll often have a quart by breakfast and can tell when it starts passing through me as fast as I drink it and it is clear. This is when I know I can slow down on my supply for the morning. Guys out on their hard-labor jobs are usually getting quite a lot more than a gallon, in fact I know several who consume close to two gallons or wouldn't make it through their day.

A sedentary or elderly person or tiny 80-pound person or child obviously doesn't need as much as a hard laborer working in the hot sun but we all need sufficient water. Our activities will dictate how much we need and if we're paying attention we'll be getting enough. But we can all tell when someone isn't getting enough water. We can see it in the skin. A simple test is to lightly pinch a small amount of skin on the topside of the forearm and if it stays pinched, not pulling back to normal suppleness, we need more water. Ask any esthetician in your local spa what her opinion is of your skin. They are happy to help you because you are a potential client.

We are in need of that water as well to flush out the by-product or waste-product of muscle action that is typically called lactic-acid buildup. But I want you to think of it as the waste-product of muscle action because that's what it is and it must be flushed from the muscle tissue or when it remains can cause tenderness and pain. In an overworked situation it starts inhibiting proper function of the muscle and begins to create other problems even to the point of shutting down completely.

*\*\*\*Sufficient water is especially important after massage when we have moved the waste product of muscle action that is typically called lactic-acid buildup to the lymph and circulation systems to be flushed with water, or tenderness may occur.*

Over 90% of the people I've worked on that had excessive lactic-acid buildup or severe muscula-

ture issues including pain said they drink very little water. Put a lemon or lime in it! You ARE mostly water and it gets used up and needs replenishing. Don't shrivel up. Supply your systems well. For those who drink alcohol on vacation, you need to replace your vitamins and minerals as well as your water, meaning at least a glass for every alcoholic drink.

*\*\*\*Ample water is necessary for the proper structure and function of every cell of every system in our bodies.*

Experiment for yourself by measuring with a gallon jug per day for at least one week and see how you feel when you get enough vs. not enough. You decide what's best for you by doing the test.

My experience with my own muscle cramps and those of others used to take me to the idea of chemical make-up, not enough salt or potassium usually, which I adopted from western thinking. However since massage school, having worked on hundreds of people, those who have had cramps in the arch of the foot or lower leg verbally indicated and I could see that they didn't drink nearly enough water. Perhaps other chemistry was partially responsible for these particular muscle cramps, but lack of H<sub>2</sub>O and proper hydration definitely played a major part.

It just so happens that this very morning on my rewrite to my book I listened to a metallurgist who discovered a chlorine dioxide solution (MMS) to successfully treat malaria, which also happens to successfully treat many cancers, particularly of the skin, and any other acid-thriving parasites in our bodies. See supplements for more info on some amazing research discoveries and products you'll be happy to know about. In his studies Jim Humble found that those who drink too little water have an increased amount of blood-clotting going on in the bloodstream and we know clotting is a major source of stroke. So drink up!