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SOURCE: Pat Manocchia, Anatomy of Strength Training: The 5 Essential Exercises

origins of human body MOVEMENT and how it is INFLUENCED

by Majorie Lauzon, B.Sc. Exercise Science, CSIA 4, CSCF 2

I like to think that only new born babies are muscle imbalance-less. They suddenly arrive in this physical world we live in, with the need to learn from scratch how to move in their new environment that is influenced by gravitational forces, and numerous other factors.

FACTORS THAT INFLUENCE DEVELOPMENT

From learning to roll over, stand, squat or walk, babies will try and fail and try again until they succeed, and file away somewhere in their brain the way they did it.

They will adapt the way they move to their physical and social environments, and to intellectual and psychological stimulations throughout their young lives. That said, during their growth, children's motor pattern development may be affected by:

- country of origin i.e. industrialized nations vs less developed, for example having access to a high level of socioeconomic and environmental factors, activities, products and services, directly relating to their lifestyle, well-being and personal development... or not,
- family economic class i.e. rich vs poor, for instance living and fitting in comfortable homes, clothes and shoes... Or not,
- parents' exercise and eating habits i.e. sporty vs sedentary with exposure to a multitude of sporting activities and healthy eating habits... Or not,
- level of education i.e. excellent vs acceptable or lesser by following a structured and adapted schooling system that fits their learning style... Or not,
- overall interpersonal relationships quality i.e. good vs not as good benefiting from positive and constructive interactions regarding different aspects of their lives... or not.

HOW OUR BRAINS ORGANIZE MUSCLES TO CREATE MOVEMENT

My goal in this article is to emphasize some social and environmental factors that may influence our motor learning patterns, or in other words, how our brains organize muscular contractions simultaneously or in succession to create specific actions.

Consequently, the way we learned to move could have been influenced by our:

- potential access to nature and clean air, to fully equipped hospitals and other high end infrastructures and technologies for our basic use and leisure, from museums, stadiums, ski resorts, to roller coasters and aqua slide parks, and 3-D cinemas...
- posture and gait pattern we have carbon-copied from our parents, siblings, friends, everyone we spend a lot of time with or even modelling music idols and movie stars...
- sports and physical activities we were introduced to by our parents, on the streets, in our backyard, at school or after in specialized organizations or clubs. For instance, we may favour the same leg or arm to kick a soccer ball, shoot pucks with a hockey stick, throw a baseball, ride downhill on a bike, skiing or snowboarding...
- individual habits and preferences we have developed such as being right or left handed, carrying a backpack on our right or left side of our bodies, going up or down a ledge always starting off with the same foot first, carrying our skis on the same shoulder, and shovelling snow by rotating our torso toward the same side...
- past injuries or illnesses affecting our somatic or voluntary nervous system

responsible for body movements performed by our musculoskeletal system. For instance, internal and external scarring of the skin and other soft tissues, such as ligaments, tendons and muscles, may affect the communication flow from our brain to create daily living, work, leisure or sports related tasks in spite of our initial attempts to protect our injury(ies). Since that may be a smart temporary solution, with daily repetition, the new way we learn to do things becomes a habit and thus the "new usual way of doing." A common example would be an injury to the left foot reflecting, some time in the future, to the opposite hip and shoulder. Or an illness affecting the respiratory system causing a lot of coughing which could interrupt the synergy of the deep core muscles that are really at the base of any motion or, as some like to say, constitute the power house.

ASKING THE LEADERS:

To illustrate the topic, I questioned a few well known professionals in their field to elaborate on motor control, primal movements, treatment modalities and approaches, and training advice for better posture.

DAVID WEINSTOCK is from Marin County, California, founder of NeuroKinetic Therapy, an innovative approach to manual muscle testing, that he teaches to health practitioners around the globe.

What, in simple words, is motor control and how can we make it respond the best to any correction attempts?

"Simply put, motor control is the brain's ability to organize movement. We can correct it by inducing a failure and then provide it with new functional options that will make it succeed.

The science of motor control theory states that the motor control center MCC in the cerebellum, stores all the coordination patterns of the body. With the information it receives, the cerebellum provides the body with controlled movements while maintaining posture and balance. The MCC is directed by the limbic system and the cerebral cortex (or cerebrum). The limbic system is associated with the control of basic emotions, and the cerebral cortex is associated to higher functions such as thoughts and actions. All three together they create movement patterns, such as when a baby learns to stand, crawl and walk. Also it will create substitute movement patterns for when we are hurt to protect the body from aggravating the injury(ies). That means some muscles will need to work harder or be more active (compensated), for the one that became less active (inhibited). That is the motor control center that will find, for whatever reason, a substitute combination of muscles to perform the wanted actions. If this new pattern is allowed to remain in the motor control center, no timely re-education done, dysfunction and pain will follow, as per the compensator muscles become overloaded and tired, to do more than usual for too long.

The good news is with NeuroKinetic therapy, it is possible to uncover these dysfunctional movement patterns using precise manual testing protocols. Qualified therapists will then correct the dysfunctions with a series of specific exercises, to teach the lazy muscles to get back to work, so the muscles working overtime can take a rest and heal."

[Read about DAVID: neurokinetictherapy.com](#)

PERRY NICKELSTON, Doctor of Chiropractic, is from Waldick, New Jersey, owner and clinic director of Stop Chasing Pain, LLC and Pain Laser Center. Specialist in chronic pain, he is a worldwide educator on movement and the lymphatic system.

What primal movement pattern do we unlearn the most in our modern lifestyles, and how negatively can it impact our way to move and well being?

"Ever wonder why your body hurts all the time, even when you exercise? That's because something is missing: basic movement. The single most neglected primal movement pattern we unlearn in our modern culture is the simple act of spending time on the floor. Getting our rear ends (glutes) out of chairs and going back down to the ground can have profound positive impacts on your body.

You cannot learn to walk until you learn how to move first. Basic movement happens on the ground. When you sit on the floor, it's all about you and the floor. There is no way to hide vulnerabilities and weaknesses. It take strength and flexibility to get to the floor, spend time on the floor, and rise up from the floor.

Neglecting these primal resting activities leads to compensations and adaptations, because of the inability to adapt and respond to stress, fear and danger more efficiently, as for example not being able to get into uncommon positions. Active rest is a critical way we adapt to our environment. The most successful systems in nature are the most adaptable; however, they aren't the most efficient.

Sitting in a chair is efficient, but it weakens your body such as it's easy and predictable. Sitting on the ground is uncommon and inconvenient, though these type of movements make you an invincible monster.

Learning to control your own body mass is the fastest way to become more resilient; and being able to enjoy a better quality of life. The more time you spend sitting and moving on the ground, the less likely you are to end up under it."

[Floor movement - Dr Perry on You Tube: youtube.com/watch?v=NjV_P60cfes&feature=youtu.be](#)
[Read MORE about Perry: stopchasingpain.com](#)

PAUL JOHN ELLIOT, Registered Massage Therapist, is from Montreal, Quebec, founder of Stretching Canada and owner of Clinique Myolife and PJE Therapeutics. He has accumulated well over 10,000 hours of practical, clinical, and teaching hours with Active Isolated Stretching.

How can you with hands-on or movement assisted therapies change positively tissue plasticity to promote better healing?

"In my early years, I thought my job was to find the source of pain, so the compensation patterns that are at the root of the problem; to then deconstruct the dysfunction and restore proper functional movement patterns to the motor control center (MCC) of the brain. It sounded so cool... and that part is still cool! But I soon recognized that it was better to empower clients with the tools to help themselves: the best tool for me was Active Isolated Stretching.

As a therapist, I want to be able to help my clients, but I adore the thought that they can not only continue the work on their own, but they can potentially show someone else the stretches of their stretching protocols - Now I'm helping someone I've never met! Sharing the technique is only one part of the equation. I also need to explain the importance of some of the biomechanics, which relates to the mechanical laws relating to movement, as well some neuroplasticity concepts to understand why the brain will need to be fed repetitions from the corrective exercises.

Neuroplasticity is the brain's capacity to adapt, at a cellular level, the way our body relearns to move after injuries and illness.

Finding the source of pain, for me, is the easy-ish part. De-constructing and re-conditioning/



creating a new and healthy neural patterns... well, therein lies the rub!

To be frank, a therapist can only do a portion of the fixing/healing job. I rely on client involvement to continue the work we discovered in session. I explain to the client 1. That the repetitions of their corrective exercises help to set the new pattern into a long term memory, and 2. That the daily repetition for the following months is as important as the exercises themselves.

Ever heard the mantra: a muscle pattern can become dysfunctional in as little as 300 repetitions, but takes up to 3000 reps to affect positive change with proper neural re-patterning? That is a ratio of 1:10! The odds aren't very good; however the reality is that it's these very repetitions that will stack them in our favor to reprogram our neuroplasticity.

And while these repetitions are crucial to rehabilitation, as a therapist and as a patient, I know that maintaining a daily regimen of corrective exercises can be challenging. It's with this in mind that I like to empower my clients with Active Isolated Stretching. These stretching protocols help release clients from their pain and restrictions by themselves, at anytime, and almost anywhere, to achieve maximum results with minimum effort.

In clinic, once a client's dysfunction has been released and a positive reconnection has been established in the MCC, I optimize (lengthen, strengthen and oxygenate) muscle groups with AIS. I teach my clients stretching protocols that can not only help maintain their resolved problem in clinic, but enhance their physical performance so that fatiguing muscles are less likely to slip back into dysfunctional patterns.

What are the modalities you prefer to use for different types of injuries?

"I work with a plethora of modalities; however I favour the following: Active Isolated Stretching, NeuroKinetic Therapy (NKT), Craniosacral Therapy, Core Myofascial and Structural Myofascial Therapies, Immaculate Dissection, and a host of massage techniques.

For many issues, I follow this path where I do a series of assessments, including NKT, to determine the source of the initial complaints; from there I fall in to AIS for release or Myofascial Release of some sort, to finally reassess with NKT. And if ever I get lost or stuck, I quiet down the clinical situation (mostly myself/my ego) with craniosacral therapy. It's there that I can listen deeply, let the body come to me to reestablish contact with either the original problem or a new one."

What posture training advice do you preach the most to influence positively our musculoskeletal alignment to avoid injuries?

"I like to recommend some AIS stretching protocols for lower and upper quadrants, all of which takes approximately 5-6 minutes and is well worth doing."
[See the programs: kinesiologywithmajo.com/images/uploads/blogs/AIS_short_program.pdf](#)

As a marathoner, full time therapist and nationwide teacher, I have found AIS to be a vital component and secret weapon to the prevention

of injury, maintaining or improving performance, as well as rehabilitating injuries when they occur occasionally."

[Read MORE about Paul J.E.: pjetherapeutics.ca](#)

PAUL KENDALL TURNER, Practicing Kinesiologist, is from Langley, BC, owner and founder of 3PK (Three Peaks Kinesiology). He guides elite athletes and clients with chronic pain to achieve success and well-being.

How can you with hands-on or movement assisted therapies change positively tissue plasticity to promote better healing? What are the modalities you prefer to use for different types of injuries?

"The two techniques that I like when assessing clients are The Voila Method and Fascial Stretch Therapy (FST). The first time I meet a client, I get a full history and ask what movements or positions they are having pain or coordination issues with. I try my best to assess my clients in those positions or movement patterns of issues to help correct and balance their mind and body doing them. I find that in general treatments are too much on the table, thus not addressing enough the real problematic of poor body position and movement patterning. The Voila Method looks at those aspects with thorough assessments to find what needs to be corrected.

The corrections I make may be done standing, seated, on the table, or at times in motion to improve very specific aspects of the tasks in question. I use the combination of other techniques and modalities to help the tissues heal faster, and to get the best results: it might be vibration therapy, laser therapy, shock wave therapy, deep oscillation therapy or Rock-Tape application, always to help the brain with direct proprioceptive feedback. I also use FST to facilitate better movement via the neuromyofascial web and stretch the body in places that need to be stretched."

What posture training advice do you preach the most to influence positively our musculoskeletal alignment to avoid injuries?

"Move and have fun with movement: PLAY MORE. I think we should avoid getting stuck in positions day in day out, so playing and exploring movement is a way to break that cycle.

In addition, movement efficiency isn't just about our body, i.e. its muscles, nervous system, skeleton and connective tissue. Our emotions, eyesight and perception of things can also affect our ability to move well. A big part of our perception is influenced by our eye ability of converging, diverging and tracking, to see well objects close and far and in different orientations.

I think that we need to look at the body as a whole and not just as individual parts. With this in mind, to stay on top of our health we must surround ourselves by a strong team of experts, such as optometrists, psychologists, massage therapists, physiotherapists, chiropractors, kinesiologists, exercise physiologists, athletic trainers, dieticians, etc.

*As for eye care I recommend a practitioner certified with the Neuro-Optometric Rehabilitation Association (NORA)."

[Read MORE about Paul K.T.: 3pk.ca](#)

To visualize more easily how the jargon above fits into real life, I asked two Canadian former Olympians in Alpine Skiing and Ski Cross, to share their own experiences and typical risks of their sport on their body.

BRITT JANYK, from Whistler, BC:

What recurrent injury types occur in your sport and why?

"In Alpine Skiing, knee injuries are definitely the most recurrent. The knee injuries are so common in skiing because of when the skier lands, or ends a turn, on the tails of the skis, the skis acting as a lever pull the lower legs further forward, provoking the femurs to drop backward with the body weight; therefore creating excessive stress on the knee joints to the point of failure.

Back injuries are also popular because there is so much force being produced in a high speed turn, that the back and core muscles must be extremely stable and strong to withstand these forces."

Did you get injured in your sport and what was the most difficult healing aspect and why?

"In my career, I had one ACL reconstruction at the age of 18, and two knee endoscopic surgeries to repair some meniscus. All was on my right knee. The most difficult aspect of the healing was realizing that the body breaks, and that I wasn't able to do what I loved doing. Only once I was going through the really hard and demanding healing aspect, I realized how important consistent good quality rehabilitation is. My say now, is even when we aren't injured, we need to do some types of exercises to prevent injury: this is actually what is the most important!"

[Read MORE about Britt: olympic.ca/team-canada/britt-janyk](#)

DAVE DUNCAN, from Squamish, BC

What recurrent injury types occur in your sport and why?

"Lower back and hip issues seem to occur over and over again, with no crashes or any violent mechanism of injury needed. I believe it's because some of the moves or body positions we have to get in, to absorb a jump properly, take place at a rapid pace and demand the body to be in unusual positions. Also the range of motion required at the hips is maxed out; and with aggressive and dynamic compressions, occurring from the act of skiing at that extreme level, harsh impacts compress the spine, while in a fully bent or compact position, implying very limited capacity of absorption left for protection."

Did you get injured in your sport and what was the most difficult healing aspect and why?

"Yes, I've been injured from competitions. A concussion was probably the hardest injury I've had to come back from. I think it was because of the aspect of not really having a time line for how long it would take to recover. I passed all the tests after a month to resume competition; however, when I got back into competition, I knew being able to pass a concussion test versus being ready to compete, were two different things. It wasn't until I tried to compete that I realized my level of vision I needed for my sport was still impaired, and it took me another 4-6 month to correct it.

I also went through a two-year period where I was constantly injured by minor ailments. As soon as I felt ready, I would get back to training, but I would never truly be at 100%. One injury led to another, and I continued down this path until I couldn't move properly on my skis and became a shell of my former self. I had to hit a hard reset on my body, and give it the time it needed to truly recover. Also, during this time, with the help of a lot of people, I reeducated my body on how to move properly, with optimal movement patterning, requiring me to put more emphasis on my flexibility training to obtain an appropriate range of motion for the demands of my sport."

[Read MORE about Dave: http://dave-duncan.ca/](#)

IN CONCLUSION

Fundamentally, the point I want to showcase in this article, is how much we need to expand our vision, attention and efforts to increase how well we feel in our own skin, in order to move freely with ease and without pain. As a kinesiologist, it is always my goal to help you at a physical level, while considering all other related aspects of your life.

In my own practice, I like to start with someone new by learning some history from their past experiences, execute several postural and basic movement pattern assessments, then narrow down my investigations with NKT. This enables me to create an action plan for manual treatments AIS, FST, Myofascial Release MFR and others, corrective exercises, and down the road progress to the gym to translate the skills to your sporting practice. I believe that having solid professional guidance in these health fields will accelerate achievement of your goals.

In these lines of thought, I emphasize the importance of keeping an open mind to trying new ways of movement and suggested physical activities and exercises. This forces one to adapt to any situation, by exploiting all aspects of our individual sphere as a human.

So try something new tomorrow: go figure skating, belly dancing, play underwater hockey, sepak takraw, or cheese rolling... actually that last one I would definitely avoid it, unless you really wish to end up on my treatment table for some fine Majo torture!

[Read MORE about me – Majo: www.kinesiomajo.com](#)



Skier: DAVE DUNCAN