

The Path of Least Resistance

BY DR. DARIN WORKMAN

Recently, an article in *Discover* magazine caught my attention. Bear with me as I relate it to you. I'll explain its relevance later.

A physiologist named Giovanni Cavagna has dedicated 40 years to the study of walking—a very complex movement that we take for granted. Cavagna was intrigued by the fact that African women can carry enormous loads on their heads (as much as 70 percent of their body weight) for great distances without trouble, while people in other places of the world struggle just to walk while carrying 15 percent of their body weight. He found that the key to their ability was in the way they walked—their technique, if you will.

I have heard it said that walking is merely falling forward in a controlled way. This is actually quite accurate. The body leans forward, and the feet take a step to keep the center of gravity from falling to the ground. Most people take a step, converting downward motion into forward motion. In doing so, they plant the foot in resistance of the downward motion, but they actually slow the body down in the process while wasting energy in muscle contraction.

However, the African women walk in a way that pushes the body in forward motion more smoothly and without as much resistance. Most of us lose 35 percent of our energy through this resistance, but African women only lose 20 percent with heavy loads—all by changing the way they use their bodies. In doing this, they conserve energy, and they are able to carry heavier loads for longer periods of time. Simply put: They walk in a way that follows the path of least resistance.

This concept of taking the path of least resistance is applicable in everything we do. For years, I have treated patients, written articles, and given workshops on how to move the body through the path of least resistance. By doing this, we move with increased strength, coordination, and endurance. It is also a key factor in reducing injury. Let's discuss how this happens.

STRENGTH: "...the power of exerting or withstanding pressure, stress, force; potency; effectiveness."

Anything that gets in the way of what you are trying to accomplish is called resistance. It takes more strength to do something against resistance than with-

out resistance. In addition, moving against resistance wears things out faster.

One example is driving a car with the parking brake on. True story: While on vacation recently, I pulled a rental car over to load some luggage. It became increasingly more obvious to me that the car was dragging, and I was pushing heavier than usual on the gas to get it to move. Finally, my brain figured out that the emergency brake was engaged. When I released it, I was amazed how freely and strongly the car moved. We all had a laugh at my oversight.

I might have sensed it earlier if my mind wasn't occupied with other matters. We do the same thing, overlooking obvious resistances to our movement, because our minds are occupied with something else and/or we are too focused on what we are doing. By spotting the things that resist our natural movement, we disengage parking brakes (so to speak) and have greater strength and power.

COORDINATION: "...balanced and harmonious movement of the body."

Coordination is the ability of the brain to understand and enable the body to do



Playing in large venues at high volume for long periods of time requires a great amount of strength. (Drummer: Sean Paddock)



When playing and reading some types of music, such as jazz, a great amount of physical and mental coordination is required. (Author playing in a jazz band.)

various things. The mind is much like a maze, with different pathways and dead ends. When trying to learn a new concept or physical movement, you must break down the walls that block those pathways and prevent you from progressing. With time and practice, the walls are destroyed, making the path easier to travel with each repetition.

The same wall may be difficult for some and easy for others to break through. We each have a different maze with our own walls.

My point is that resistance to normal body movements creates one more obstacle the body must deal with, leaving less energy to break down walls that block our coordination. For that manner, anything that causes resistance, be it physical, mental, emotional, or spiritual, will have a negative effect on our coordination.

Physically, the muscles are able to coordinate movements much more readily if they have less fatigue and resistance. Next time you are really tired, notice that your movements are shaky, uncoordinated, and your hand/eye coordination lags.

ENDURANCE: “the capacity to keep going...”

Total energy, minus energy used for each motion, equals the total number of motions possible. This is a simple equation. By reducing the amount of energy

you exert for each motion, you will be able to do more motions before you fatigue.

Let’s say you have one dollar and you’re buying candy bars. If you spend 50 cents for a candy bar, you can only buy two of them. But if you only have to spend 25 cents for a candy bar, you can buy twice as many. Likewise, if you’re spending 50 cents’ worth of energy to play a passage, you will be able to play twice as long by using half as much energy.

By following the path of least resistance, we can conserve energy when we play, allowing us greater endurance to play longer. The way we sit, the way we move when playing, the size sticks we use, and even how we think all consume energy and affect our total energy storage. Once energy gets low, the body nears fatigue and its movements become sloppy and lazy. This wears the body down, making it more susceptible to injury.

REDUCED INJURY

Imagine someone driving by pushing on the gas pedal with one foot and the brake with the other. They are trying to speed the car up and at the same time slow it down. They’re actually fighting against themselves. How many of us are guilty of this when doing various actions—especially playing an instrument? We grip the stick so tightly that while one muscle is trying to push it toward the drum, the other is fighting to keep it where it is.

Driving this way wears the brakes down, just as physical movement in this way wears the body down. I have a difficult time understanding why a person would consciously do that, and not change the behavior when it is brought to their attention.

I spend countless hours bringing such behavior to my patients’ attention when they can no longer function because of it. Many of them are drummers, like you. I am calling it to your attention now. Stop fighting your own movement. Figure out how the body is designed to move and allow it to do so without resistance.

Here’s what happens if you don’t: Because of resistance, the muscles must work harder than usual, they fatigue early on, and the brain continues to drive them to do things in a fatigued state. This breaks down the muscle fibers, causing contraction and spasms. The tightness puts more pressure on the joint, causing it to get hotter from the friction. The heat breaks down the tissues in the joint, causing injury and pain.

In addition, the muscle problem causes further resistance to movement, which decreases coordination. This means that the body cannot do what the brain requests. We have all felt the frustration that results. This frustration causes more tension, making it increasingly difficult to play. From there, the cycle continues until you are rendered incapable of playing.

I know that it sounds pessimistic and far-fetched, but I see it all of the time; it is a reality.

THE SOLUTION

Let’s discuss the basics of how to reduce resistance. First of all, we cannot stop all resistance. The body can operate efficiently with a slight level of resistance; it is part of movement itself. The key is to reduce *needless* resistance. Here’s how:

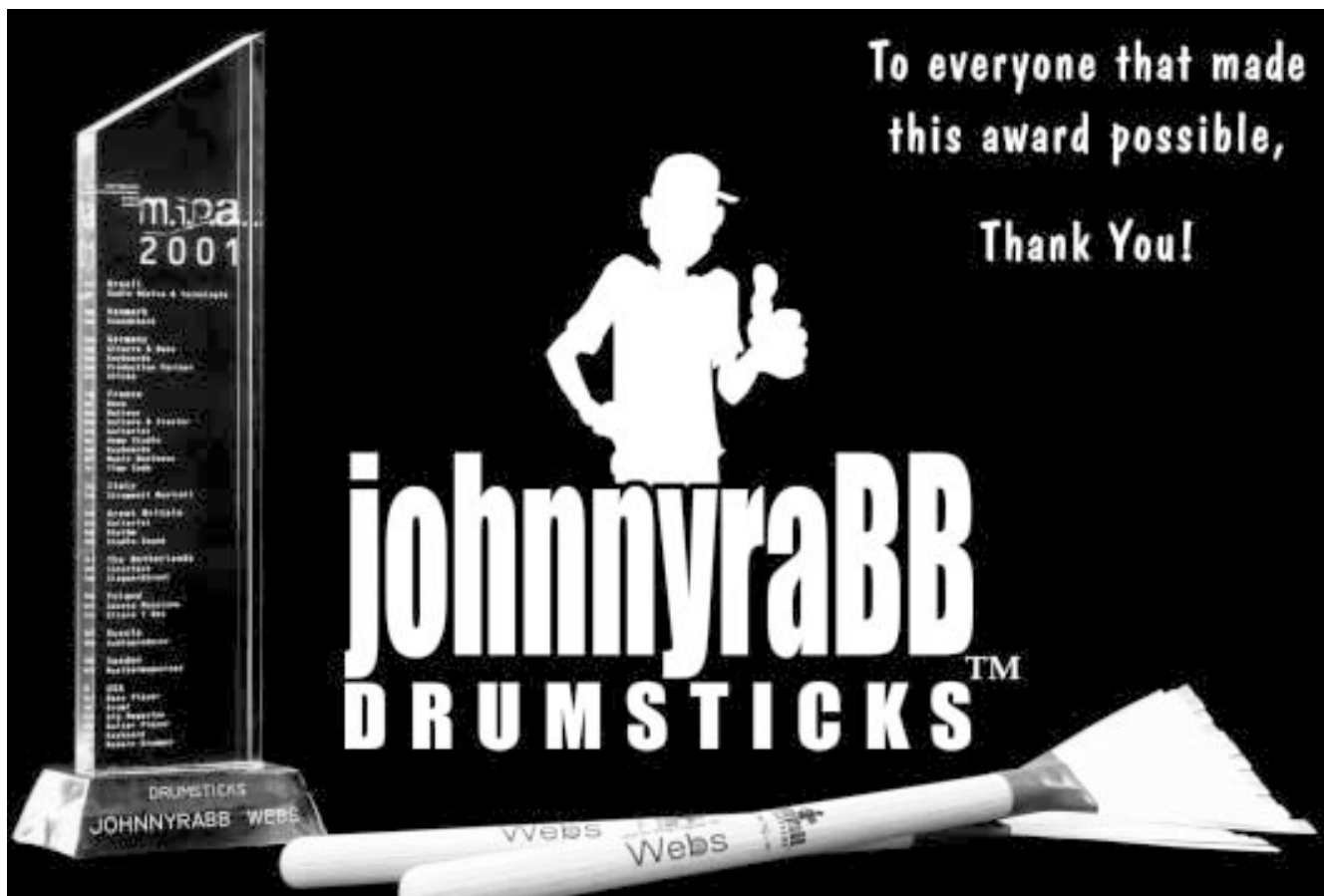
1. **BE TAUGHT PROPERLY.** There are some great teachers who can save you a lot of this pain and money (yes, money). They protect you from injury and from going back to relearn what you missed.

2. **LISTEN TO YOUR BODY.** Every time you play, the body tells you what it needs. It is speaking when you feel awkward and rusty. It is YELLING at you when you feel pain. Try to listen carefully and change the movements it tells you to.

3. **WATCH YOURSELF AND MAKE CHANGES.** Whether by use of a mirror,



Marching requires a great amount of endurance—especially in hot environments for long periods of time. (Allen Elementary Percussion Ensemble, Houston, Texas)



Percussive Arts Society Board Nominations

The deadline for nominations for members to the 2003 PAS Board of Directors is February 1, 2002. All PAS members are eligible for nomination. Self nominations are acceptable. Nominations must be made in writing and should include nominee's name, address, telephone number, fax number (if available) and e-mail address (if available). In May, official ballots will be included in Percussion News and sent to all PAS members. Send letters of nomination to PAS, Board of Directors Nominations, 701 NW Ferris Ave., Lawton, OK 73507-5442; fax: (580) 353-1456.

video, or other method, analyze your playing, then make suggestions to yourself as you would to anyone else you were watching. Try writing them down.

4. FIND MUSICIANS THAT AREN'T IN PAIN. Observe the musicians that *don't* have problems—those that look relaxed and smooth when they play. You are doing something different than they are; find out what it is, and mimic them.

Don't ever be too proud to change the things that stand in the way of your improvement as a musician (or any other area, for that matter). You will only loose in the long run. Remember: Wise people learn from their own mistakes, and an even wiser person learns from the mistakes of others.

Choosing the path of least resistance is a developed ability. By being aware of how your body feels while moving, you can sense resistance to a movement. This should be your concern in every body movement and all thoughts.

If you try taking the path of least resistance, you will be pleased at the benefit you gain from it. I love treating musicians' injuries, but I would much rather have you avoid them in the first place.

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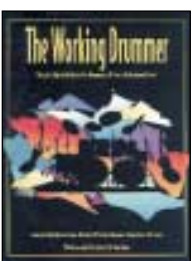
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