

## Opinion

# Tensegrity: Does It Balance Your Life?

Architect Buckminster Fuller is credited with inventing the portmanteau of tensional integrity that describes a structural equilibrium of opposing forces, a principle that explains why geodesic domes don't collapse. Recently, tensegrity has become the leading theory explaining cell mechanical behavior, such as cell spreading and motility. It may also be the pathway by which mechanical stresses are transformed into biochemical responses through mechanotransduction. It may even explain how proteins fold in predictable ways. More precisely defined, tensegrity is based on the synergy between coexisting pairs of forces, of push and pull, compression and tension, or repulsion and attraction.

Cardiovascular research has shown that tissues and organs achieve homeostasis through tensegrity. For example, an increase in venous return hydraulically distends the sinoatrial node, steepening its pacemaker potential, thus increasing heart rate.

My partner in practice, Murray Johnstone, MD, has spent his research career proving that aqueous outflow is not a passive process, but one that continuously varies depending on the transient and steady forces that are applied to the trabecular meshwork and Schlemm's canal. The outflow apparatus is capable of doing so because it is an embodiment of tensegrity.

The whole body is a model of tensegrity. With every step, muscles drive the

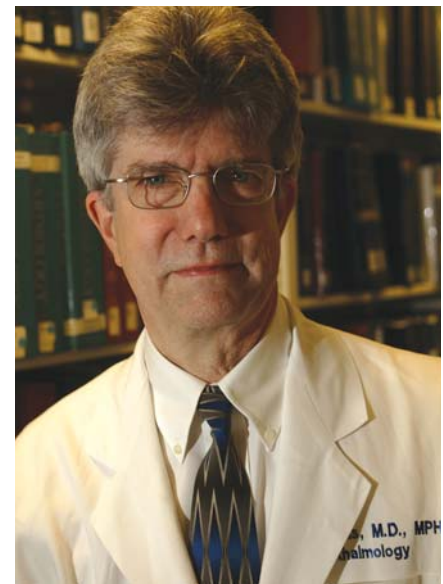
leg, but other muscles alter their tone to maintain balance. So if cells and tissues and organs and whole organisms all have tensegrity, what about our feelings, our emotional reactions to the world around us? We're talking you and me here.

I think it was during residency that I realized there was always going to be more to do than there was time available to do it. The backlog of unread journals provided the weightiest evidence of that. Psychologically, the need to master all of the accumulated knowledge of the world about the eye was oppressive. The professional side of my life was the squeaker wheel, and I did what most residents of my era did: work harder. It didn't seem so bad; after all, my medical school colleagues who had chosen other specialties had to stay up all night to boot.

Predictably, my family started to object. Despite my love of my professional life, I also realized that without balance in my life, everything at work and home seemed to offer less fun. So I found middle ground, or at least so I thought at the time. In the 30 years since then, I have carefully nurtured that misconception. It is only recently that I have had the epiphany that I am not skilled enough (combination of smarts and persistence) to *intentionally* balance my life, like a quantitative chemist carefully weighing each ingredient. Tensegrity does it for me. All I need to do is put a value on each of the forces pulling me in different directions (how hard does each one pull), and the

equilibrium happens by itself. If I don't like where I'm at, I just tinker with the valuations; I don't try to steer my ship toward a given point.

Don't get me wrong, I'm not claiming that tensegrity can overcome all forces, especially sudden, traumatic ones. And I'm not claiming that you'd like to live at my equilibrium point. In fact, I admire my younger colleagues, whose valuation of free time is different from mine. To those of you who have figured this out a long time ago, my congratulations. To those of you who have not, maybe these words can help you welcome the stresses in your life as key elements in your emotional tensegrity.



RICHARD P. MILLS, MD, MPH  
CHIEF MEDICAL EDITOR, EYENET