

Jenga for Understanding Human Compensation

By: Nicholas Rostocil R.M.T.

Jenga...that beloved wooden block game played by millions, young and old alike, around the world, could possibly be the perfect metaphor to understanding compensational dysfunctions in the human body. If you're not familiar with Jenga, or have never played the game, allow me to summarize.

Jenga consists of 54 wooden blocks, stacked in rows of three, in alternating directions, 18 layers high. The object of this game is to remove a block from a lower portion of the structure and place it on top while preventing the tower from falling over. As more and more blocks are removed and placed on top, this becomes increasingly more difficult. So how does this game relate to the human body? You ask. I promise, if you continue to read on, it will become clear.

As an instructor of Massage Therapy and Structural Integration, I wanted to find a way for my students to better understand the intricacies of the human structure and how everything within the body is connected (a concept known as Tensegrity). I also wanted them to understand how easily the human body compensates for problems on a day to day basis. But, before I get into that, I would like explain, in brief, the concepts of Tensegrity and compensation.

Tensegrity

Tensegrity, a concept developed by architect, inventor, and cosmologist Richard Buckminster Fuller and is defined as follows: "The word 'tensegrity' is an invention: a contraction of 'tensional integrity.' Tensegrity describes a structural-relationship principle in which structural shape is guaranteed by the finitely closed, comprehensively continuous, tensional behaviors of the system and not by the discontinuous and exclusively local compressional member behaviors. Tensegrity provides the ability to yield increasingly without ultimately breaking or coming asunder". (Synergetics, p.372) In simpler terms, tensegrity describes a structure whose solid components are suspended by a tensional network of cables. The solid components seem to defy gravity because none of them actually contact one another; and when placed under stress, such as compression, segments of the structure must yield or resist, but not break, in an effort to compensate for the stress.

Firm comprehension of this concept, when applied to the human body, helps us understand how our bodies defy gravity as we assume an upright position. Most of us don't give standing upright a second thought. We do it every day for the majority of our lives. But living as an upright being comes with a price.

When we compare the tensegrity model to the human body, we find that the solid components would be our bones and the tensional network would be our system of soft tissues (muscles, fascia, ligaments, and tendons). These tissues are constantly working with opposing forces to ensure that the structure remains upright; and much like the

concept described above, our bones do not directly connect to each other; but instead they are suspended and maintained by a system of soft tissue. What does this mean for us? It means that in order for us to enjoy our bipedal lifestyle, our myofascial network must communicate constantly and adjust accordingly when part of the system experiences stress. And how does our body adjust to stress? Much like the tensegrity model...it compensates for it.

Compensation: I've always believed that there is nothing we do better. We are a creature that can compensate for harsh environments as well as varying landscapes and terrain. Whether we suffer major injuries, muscular pain and discomfort or simply a paper cut, our bodies adjust to allow us to continue operating. Now, our bodies can compensate for a short time when we experience a short term problem, but what happens when our problems become long term?

Chain Reaction

Our joints are designed to distribute weight evenly throughout the body, but when we compensate, for whatever reason, that weight distribution changes and the affected joints must now bear an imbalanced load they were not designed to handle. These imbalanced loads can create compression and abnormal wearing in the joints as well as a redistribution of compressional forces in the remaining joints throughout the body. A chain reaction of sorts is created and continues until no more compensation is necessary. As a result of imbalances and the associated compensation, conditions such as Arthritis, herniated discs, and the like can occur in the body.

The Discovery

The phenomenon of compensation occurs instinctively in all of us. When we stub our toe in the middle of the night, we don't have to think about how we are going to keep moving and remain upright with this new burden of pain, we just do it. So, what would it be like if we did have to think critically about compensating for imbalances? How could I describe it? This is the question I asked myself; and I found the answer in the most unsuspecting place.

As I mentioned earlier, I wanted to find a way for my students to understand both tensegrity and compensation; and I have found that way in Jenga. The game makes for an excellent human analog. My students are always excited to find out that they will be playing Jenga in class until I inform them of the catch, which is this: They must imagine each block as representing various parts of the human body and they must describe to me the imbalances that are created when we remove one or more of those blocks. An example of this would be the center blocks possibly representing the internal/intrinsic structures of the body and the two lateral blocks of each level represent the external/extrinsic structures of the body. They could also be thought of in anterior/posterior and medial/lateral relationships. When the student removes each block, they must discuss the injury/dysfunction it might represent and how the rest of the structure must compensate. Let's play.

It's Your Move

Let's say we remove the two lateral blocks on the bottom row of the structure, this might represent collapsed medial arches which centers all of the weight medially and forces the structure to balance itself on a less than stable base. Conversely, if we remove the center block leaving the two lateral ones, this could be thought of as inversion of the feet. This pushes all of the weight out laterally, forcing the lateral arches to become weight bearing arches instead of providing support for the medial arches, which are the ones designed to bear weight.

Or, how about if we remove a lateral block from somewhere midway up the structure? This might represent a strained Q.L. This would force the opposite Q.L. to work harder to maintain an upright position, all the while, putting it under excess strain which would lead to its eventual dysfunction and the metaphorical removal the opposing lateral block. Now all we have left holding up the structure is the intrinsic musculature and the spine, which was definitely not designed to work alone to maintain our upright posture. We can now imagine how much compressional force is being applied to those vertebrae. Given enough time, this could definitely lead to debilitating problems such as a herniated disc and potential nerve impingement syndromes like Sciatica.

For a final example, let's say we remove the center block at the same level as we did for the Q.L. This might be seen as a weak Transverses Abdominis which is no longer providing the necessary stability needed between the rib cage and the pelvis. As a result, the erectors and Rectus Abdominis must now work to stabilize the area and this can very easily lead to low back pain as well as structural deviations such as ventral drag and an anterior pelvic tilt.

As we continually remove blocks, the structure must compensate until finally, the structure topples and we all yell, Jenga!

Keep in mind that the examples cited were simple in nature designed to provide a basic understanding and they can be as complicated as desired, be creative and use your imagination and you will discover endless possibilities.

I hope you found this article an informative and useful tool for understanding compensation, or if you are like me, an entertaining way to teach others. I also hope that, like me, you will never look at Jenga the same way again. Happy gaming.

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