On Standing

By Michael Protzel

Human beings are born with a highly evolved innate uprighting capability that enables us to lift ourselves into verticality with minimal effort.

In the first year of life, all of us learn and employ this innate system. At around 6-months of age, we sit easily and efficiently; at around 1-year, we stand. We learn these vital skills without being taught by anyone else. They are in our DNA. Our newborn kinesthesia guides us to exploit the power of our gravity-compelled body mass. All we need do is allow gravity to take our body mass *straight* down to earth. This sends our weight directly into our balance points, planting our skeleton optimally and activating our deep extensor muscles that lift us most efficiently. It feels good....and it works. This ability has been millions of years in the making.

Yet, also in the first year of life, at the same time we are actualizing this amazing innate sitting and standing capacity, we are also noticing all of our elders constantly sitting back in chairs, sofas, car-seats, etc. These images make an indelible impression. They condition us to accept as normal and appropriate the act of throwing our weight *backwards*. This conditioning — of which we are unaware — has lasting influence.

Sitting back into chairs interferes with gravity's *straight*-down influence. Our coordination invariably declines when we direct our body mass down to Earth on a trajectory *other than* straight down. When we "commit body weight" inaccurately, the force of our downward-moving body mass starts working decidedly against us. When done habitually, it causes chronic problems.

Sitting Beautifully as Infants
At Age 5, Not So Much

In sitting on a chair or couch, as the pelvis and lower torso fall backwards, compensatory reactions become immediately necessary. The upper spine needs to be pulled forwards, and the head (and eye-balls) repositioned, in order to maintain a relatively vertical head/neck, and a functional sight-line. We make these adjustments automatically, subconsciously. We don't notice the muscular strain or skeletal distortion.

Starting at age 3 or 4, we begin to sit back with alarming regularity. In modern society, it is a rite of passage we cannot avoid. Through it, we are transformed from infants/toddlers embodying the wisdom of the ages, to 5-year olds slumped in our school chairs or on the couch watching TV. The society-wide acceptance of sitting-back keeps each of us trapped in a manner of uprighting far removed from the innate. There are no anatomical structures behind us to catch our weight. *By sitting back repetitively, we lose the vital kinesthesia linking 'how we go down' with 'how we go up.'* And, of course, this kinesthetic disconnect doesn't just magically disappear when we yank ourselves off the couch. It spills over into all of our standing and locomotive activities.

Sitting Back Into Chairs Repetitively Distorts Our Skeleton and is the Source of the Common Slump

As adults, we may believe that we sit-back by choice. This is a delusion. The tendency to commit weight backwards is programmed deep within us, operative even when we 'sit up straight.' In this context, only strenuous muscular activity keeps us vertical. That's why we can't sit up straight for every long. We've transformed something we could do near-effortlessly as infants into a Herculean task.

Big Difference in Standing Technique
Between Toddler and 5-Year Olds

Sitting and standing without awareness, guided by bad habits that start early in life, is responsible for the bad posture we see all around us, and helps explain the chronic foot, knee, hip, back and neck injuries so common today.

The rest of this article focuses on standing, and compares the uprighting reactions that are generated when we allow gravity to take us straight down with those that are generated when we alter gravity's influence by mis-committing our weight.

Innate Standing — Following Gravity's Lead

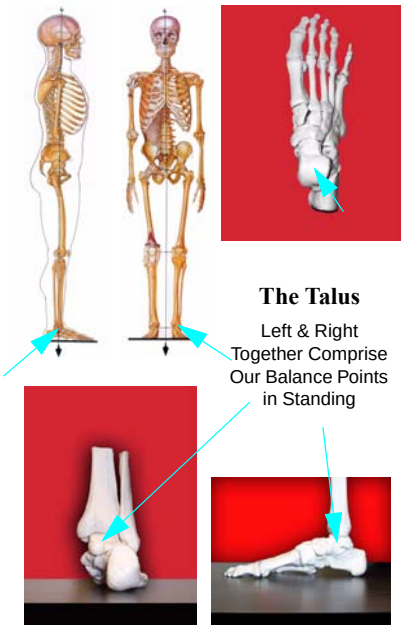
In the first year of life, we learn innate uprighting by sensing and experiencing. We are strongly motivated by our desire to stand up. We discover in short order that to be successful we need to allow our body mass to fall straight down. There is no other way to stand as infants. We have yet to establish the musculature to support mis-directed body mass. As infants, when we mis-direct, we end up on our bottoms, quickly.

In innate standing, as gravity takes us straight down, all joints are free to flex. When we flex, our body mass descends. This descent requires no effort on our part, but generates substantial energy. Sensitivity to the forward-shifting ground contact that occurs as we flex and descend, enables us to stop the flexing near-instantly. This transforms the downward energy into upward energy, activating our deepest, most powerful muscles to extend the joints the tiny amount they have flexed. This is innate uprighting — lifting ourselves with minimal effort, using means that can easily be sustained for extended periods. No need to brace and hold ourselves up. The act of innate uprighting is a ongoing flexing/extending cycle, just as the act of breathing is an ongoing exhalation/inhalation cycle.

A key feature of innate standing is the *roundedness of the heel.* This roundedness creates a pivot-point that enables the foot to rock side-to-side and front-to-back. This gives us the flexibility that is essential for navigating the uneven terrain here on Earth. When we hit an unexpected bump in the road, we need to adjust immediately or risk breaking bones.

This roundedness of the heel is also a key feature of our innate uprighting ability. As all of our joints flex a tiny bit (occipital, vertebral, hips, knees, ankles), the force of our body weight goes directly through the tibia (the large lower leg bone) and squarely into the talus (the top foot bone). The two tali — one on each foot —comprise our balance points in standing. Because the talus is located far to the medial side of the foot, when the force of falling body mass passes straight through it, *our rounded heel rocks medially.* This takes us into the strong part of the foot. Solid ground contact is created at the ends of the longitudinal arch: (1) on the heel, a little forward and medial to the pivot point, and (2) on the two sesamoid bones on the ball of the big toe (taken together, one weight-bearing point).

The ability to generate and use the energy of our body mass is made possible by the roundedness of the heel. If the bottom of the heel was flat, the heel could not move. Our body mass could not descend. Because the heel *is* round, the body can, and does, descend. As we flex and descend, ground-contact on the heel and on the ball of the big toe shifts slightly in a forward and medial direction — on both feet simultaneously. Deep ankle extensors and powerful plantar muscles are stretched. In these stretchings, the energy generated by our descent is 'captured.' By being sensitive to the shifting ground contact at the heel and at the sesamoid bones on the big toe, we are able to stop our descent on command. This stopping unleashes the energy that has built-up in the stretched foot and ankle muscles, jump-starting our movement upwards — a journey that involves our deep extensor muscles running the length of the body. They lift us into verticality



The Talus

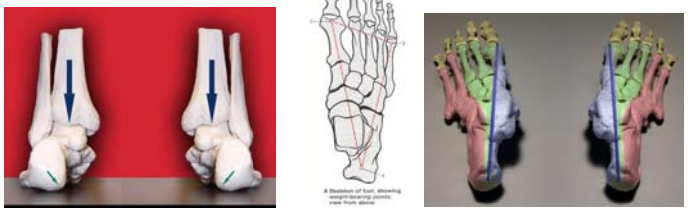
Left & Right Together Comprise Our Balance Points in Standing

Our Rounded Heel

Provides Essential Front-to-Back and Side-to-Side Flexibility

Toddler easily finding straight-down and straight-up standing on tilted ground.

Same person at age 22 can't find straight-down standing on a level, tiled floor.



What Happens When We Fall Straight Down
6-Point vs. 4-Point Standing

Conventional wisdom among anatomists and physiologists has us standing on three points as shown in the middle picture (Werner Platzer, *Color Atlas and Textbook of Human Anatomy*, 1986). It might indeed work this way if we stood on one leg and committed weight accurately. But we don't. We stand on two legs. At least, that is what we should be doing.

The left image shows clearly that when we allow gravity to takes us straight down through the two tali, each foot will rock medially on its rounded heel, taking us onto the strong, medial edge of the foot — the high point of our standing platform. Under optimal conditions, we bear negligible weight on the 2nd-5th metatarsals.

Atop the longitudinal arch, we are grounded on the pivot point on the heel and on the ball of the big toe. These four points — two on each foot — provide not only a sturdy base of support, but are key players in a dynamic structure/process that enables the conversion of our downward energy into upward energy.

with minimal effort. In effect, we bounce ourselves up, trampoline-like.

As toddlers, we all employ this innate system. We fully tap the power of our gravity-compelled body mass to lift/extend us the slight amount we have fallen/flexed. It is an exquisitely efficient system. As I have already mentioned, there is no other way for us to stand as infants. We have not yet developed the musculature to support an other-than-straight-down trajectory. As we leave our toddler years, however, this musculature develops. We become 'free' to interfere with gravity and, yet, still gain our end, still remain standing.

Common Standing Habits

Requiring Significant Compensatory Muscular Effort

Causing Noticeable Skeletal Distortion

Left: Committing weight backwards, bearing weight on the back edge of heels.

Center: Committing weight backwards and to left, bearing weight largely on the back lateral edge of left heel.

Right: Committing weight backwards, but then tensing psoas muscles sufficiently to pull the pelvis forwards so that weight is borne on the balls of the feet.

Each of these common standing postures strain leg, pelvic, torso and neck muscles. Thus, none of them can be sustained beyond a few minutes. When long term standing is required (e.g. waiting for a train), people tend to alternate frequently among their own variation of these three common habits.

Interfering with Gravity's Influence

Going straight down through the talus enables us to go straight up with minimal effort. When the trajectory of our downward movement takes us away from the center of the talus to one degree or another, we drive ourselves off balance to one degree or another. An immediate response is absolutely necessary. It comes in the form of muscular straining and skeletal distortion. But we don't notice the strain or distortion. Our concocted standing experience has always felt 'normal', 'right' to us.

The foot slopes downward dramatically, from high up on the medial side, to down low on the lateral edge. When we employ our innate uprighting capability by allowing gravity to take us straight down through the talus, we assume our rightful position atop the high, medial side — the strongest part of the foot. When we commit our weight on a trajectory other than straight down, we literally set ourselves toppling off this pedestal. We are forced to bear our weight elsewhere on the foot, grab the ground anywhere and anyway we can. The force of our body mass is now working against us. It is a matter of survival that we stop the toppling as soon as possible (to avoid a nasty collision with the ground). This stopping is under the control of our 'base-brain,' which is always alert to this potential danger. Working outside of conscious awareness, it summons large leg and torso muscles to brace our joints and restore stability to a toppling organism. This ability comes in quite handy when navigating Earth's inconsistent and unpredictable terrain. When we put a foot down, we need to be able to instantly adapt to the shape of the ground underneath us, which can cause us to lose balance in any direction. It is wonderful that we have this adaptive ability. But is an *emergency* system. We don't want to be activating it constantly, unnecessarily.

Our Safety Net

We upright with maximum power and efficiency when we allow gravity to take us straight down. This keeps us standing atop the strong, medial edge of the foot, our highest possible perch.

We live, however, on a planet with rough, bumpy terrain. When a foot comes down on ground that is not level, it is often impossible to maintain stability atop the longitudinal arch. Fortunately, we have evolved a flexible structure that enables us to adapt in the moment. We adjust our weight-bearing so that we can both remain upright and prevent broken bones.

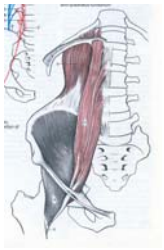
The green, red and yellow sections in the above images represent what I call our 'safety net.' When the ground throws us off-balance laterally, the structures in green and red are there to support our laterally descending body mass. When thrown too far forwards or backwards, the structures in yellow await. We are lucky to have them. They give us the time needed (and it is a short time indeed) to summon the muscle activity that keeps us from tumbling all the way to the ground. There is no safety net for a medial tumble, simply because the whole other foot is there.

Our near-constant interference with gravity's influence has us relying on our safety net near-constantly. Our kinesthetic disconnect has us falling off-center *even when standing upon a firm and level surface*.

As a result, we lose the powerful innate response that happens when we fall straight down. Instead, we create a momentary topple onto weaker parts of the foot, and need the effort of large leg, pelvic and torso muscles to brace leg joints for stability, and to pull the whole organism back towards center.

This is what we do. Lacking awareness of our command over our downward movement, we end up exercising this command poorly. We've forgotten how to fall straight down. We are continually knocking ourselves over, creating a condition of toppling, which requires continual recovery. Although it is clear that human beings can continue to function in this continual recovery mode, we do so at great cost. When we mis-commit body weight habitually, we end up distorting our skeleton, straining our joints, over-working some muscles, under-working others, squashing our internal organs, constricting our breathing, limiting our freedom of movement, wasting our energy, and who knows what else.

For example, as our sitting-back habit spills over into standing, we tend to rock backwards off the rounded pivot point on the heel. This generates a reaction far removed from the innate. As soon as we begin to rock backwards, even just a little bit, our 'base brain' registers this as a state of emergency. It recognizes that we are toppling and at risk of fracturing our skull. Immediately, neck muscles tense to stabilize the head. The upper spine is flexed forwards in order to maintain relative head-neck verticality and a functional sight-line. Action is also immediately taken to keep our feet firmly on the ground. We immediately tense ilio psoas muscles which connect the pelvis and lower spine to the top of the femur. These muscles work to pull the pelvis and spine forwards as these very structures are falling backwards. Eventually, we stop ourselves, with our weight borne way back on the edge of the heels. Without the constant tensing of these powerful hip flexors, we could not possibly commit weight backwards and remain upright. As far as I am concerned, our habit of falling backwards has made the ilio psoas muscles the most over-worked muscles in the body. Using flexor muscles to sustain extension is self-contradictory.


Ilio Psoas Dependency

Our ilio psoas muscles are meant for emergencies. We over-work them routinely.

In standing, when we commit weight backwards with no external object to lean on, they come to the rescue, holding onto the pelvis and lower spine, keeping us upright. The greater the psoas tensing, the greater the sway back.

In sitting, ilio psoas tensing is required so that we lower ourselves to the chair-back gradually, rather than slamming into it. We must also use ilio psoas to yank ourselves off the chair-back once we have anchored ourselves back there.

We often mis-commit weight *laterally* as well as backwards. This results in the common habit of standing basically on one leg, with our weight borne way back on the lateral, posterior corner of the heel. In walking, it results in our bearing too much weight on the smaller metatarsals. More on these mis-use patterns in *Learning Conscious Weight Commitment* at the *Writings* page of my website, www.uprighting.com.

Muscular Strain—Skeletal Distortion

The common habit of committing weight backwards and off to the side at the same time requires that we stiffen the joints of the back, support leg in order to remain standing. It also demands that we bend our bodies back towards center, distorting the spine in the process.

Conclusion

Millions of years of evolution has bequeathed us an exquisitely efficient uprighting capability that we all employ as infants and toddlers. Unwittingly, we trash it at a very young age by following the example of our elders, committing our weight backwards with staggering repetition. Recognizing this cultural conditioning is a necessary first step in reversing it.

Then we need to reawaken the kinesthesia that was very much alive when we were infants and toddlers. We do this by exposing our habitual means of uprighting — in sitting, standing and walking — that we continually repeat but do not sense accurately. We need to bear witness to: (1) the downward trajectory of our body mass, (2) the weight bearing sensations created moment-by-moment by a particular trajectory, and (3) the muscular reactions that ensue to hold us up. Exposing these tendencies is not easy. Our habits have been a long time in the making. Gaining awareness of (2) and (3) help to clarify (1).

By persistent witnessing, we become better able to commit weight accurately. Ultimately, all we want to do is allow gravity to take us straight down to Earth. Our innate capacity will do the rest.

Extraordinary Human Performance

Clearly, there are people who demonstrate graceful and powerful movement. Many artists and athletes fit this bill: Michael Jordan, Fred Astaire, Mohammed Ali, to name a few. They have all learned how to maintain amazing efficiency in performance of the activity in which they excel. But what about in day-to-day life?

The above images of Roger Federer, among the greatest tennis players of all time, show the difference between his performance coordination and his habitual, routine coordination.

While he has clearly maintained excellent coordination in his tennis playing, his manner of sitting has been crafted in the same way as everyone else's: by repetitively sitting back into chairs and sofas without thought or awareness.

And his body shows it.

For more on weight commitment and uprighting: www.uprighting.com.

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