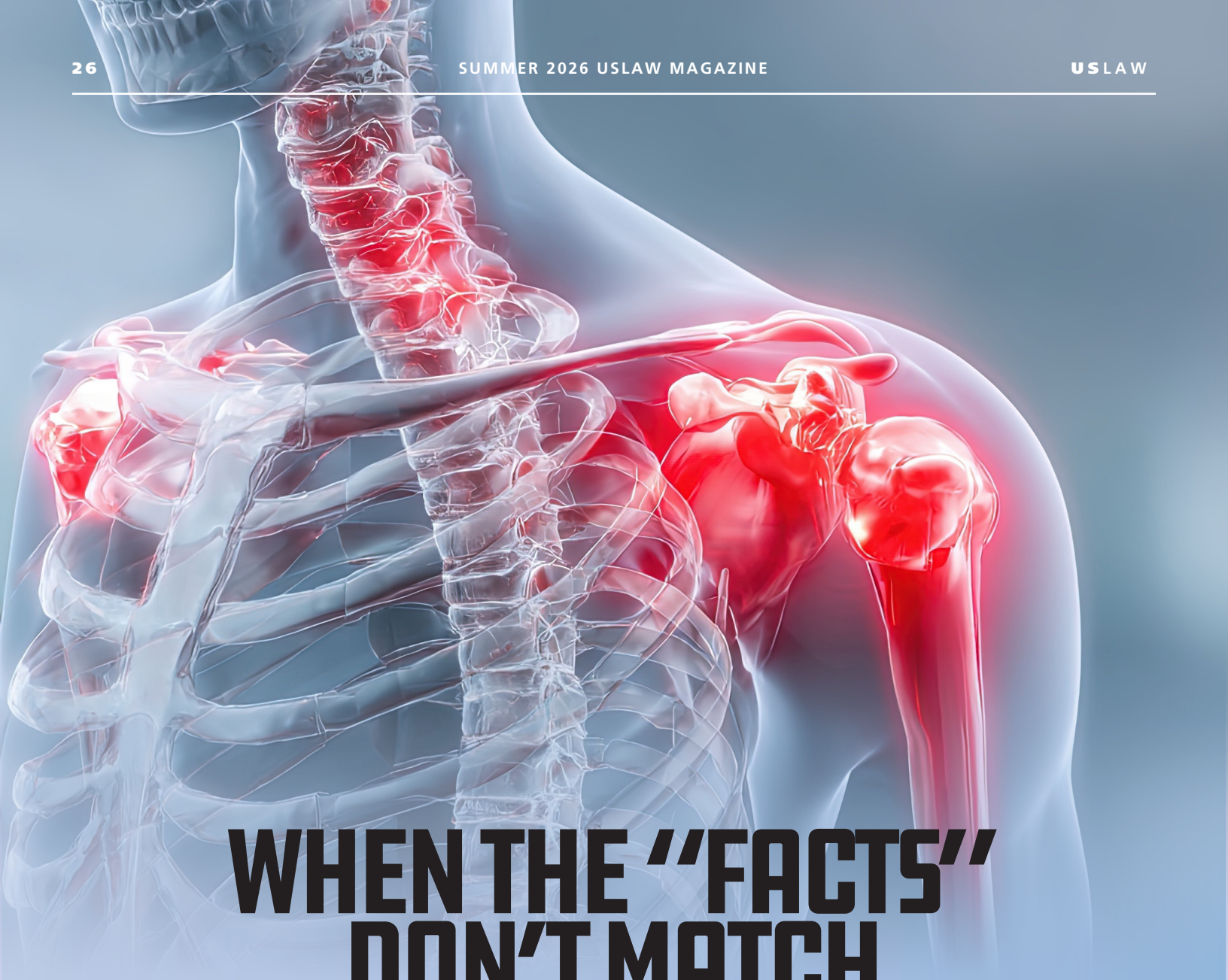

# WHEN THE "FACTS" DON'T MATCH

## *Using Biomechanical Incident Analysis with Inconsistent Fact Patterns*

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Let's talk about facts. Not facts like the sky being blue (on a good day), or facts like there exist 206 bones in the adult human skeleton (also on a good day), but fact patterns. Do we accept as "fact" that the claimant interacted with the alleged sidewalk defect and that this interaction resulted in all alleged injuries? Do we believe these "facts" with the same level of certainty as the laws of physics? Can an investigation and analysis be completed to scientifically evaluate the allegations? Oftentimes, a biomechanical incident analysis is the missing link to help with this determination.

Frequently, these so-called "facts" are the crux of the case and the main point of contention. This is particularly common within the premises liability space, in which the differences in a small detail can drastically shift not only the damages aspect of a case but also the liability aspect as well. Biomechanists, with their backgrounds not only in physics and mechanics but also in human anatomy and movement, can be uniquely poised to address a variety of concerns in these cases. By walking through several case studies, I will illustrate how the unique background of biomechanists can be used to address not only the alleged injuries but also how well these foundational "facts" fit all of the evidence.

### A GUT FEELING

Picture a person riding an old-school push scooter down the sidewalk. According to the "facts" of the matter, they are cruising right along, then boom, the front wheel of their scooter encounters an alleged defect on your client's sidewalk. Suddenly the scooter comes out from underneath them, and they fall to the sidewalk. But how did they fall and how does the way they fell explain the interaction or lack thereof? If they fell "backward" versus falling "head over handlebars" when the scooter inter-

acted with the alleged defect, how does this change things?

Not long ago we received a call with this scenario. The client said they could not get over this gut feeling that the claimant really should have fallen forward, not backward as claimed. A civil engineer had previously been sent out and determined that a.) the pavement condition was on his client's property and b.) the condition was out of code. However, the civil engineer had recommended retaining a biomechanical expert to further address the alleged incident.

Using the surveillance footage of the incident, as well as laser scans collected at the scene, a camera match was performed to confirm the path of travel of the scooter, and the motion of the claimant as they traversed the region of interest. The first allowed us to confirm something vital to the case, while the latter led to an opposing hypothesis.

Through the camera match we were able to determine that not only was the scooter tire six inches minimum away from the nearest point of the alleged defect, but the scooter operator had steered away from this area well before the alleged defect. Thus, we were able to eliminate two "facts": the scooter tire did not interact with the defect, and the operator was not surprised by the defect, as determined by their pre-incident steering input.

In addition to this, the camera match of the scooter rider's motion, specifically their pushing leg prior to the incident, allowed us to propose an alternative hypothesis for their fall. When examining the push cycle directly prior to the incident, it was determined that the push leg stayed planted even as the rear tire of the scooter passed the rear foot, in contrast to the prior push cycles. This led to the individual losing control of the scooter as their weight was not evenly distributed, which could reasonably be expected to result in a rearward fall consistent with the subject incident. Thus, understanding human movement resulted in a determination of liability favorable to the case, and allowed us to directly combat the proposed "facts" regarding incident location and inciting event.

## NEGLIGENT STAFF, OR SOMETHING ELSE

The next case occurred at a skilled nursing facility. The claimant stated that during a transfer from their wheelchair to a different seat, the staff at the facility stepped on their ankle and pulled up on their torso to lift them, resulting in a severe ankle fracture. Opposing counsel hired a biomechanist who corroborated this narrative. When the staff's depositions were taken, they all testified that the individual repeatedly denied assistance and proceeded to trip over their own two feet during the transfer. The other fact that everyone agreed upon was that at the beginning of the interaction the plaintiff had two uninjured ankles, and at the end they only had one. At this point, a standard of care expert was retained, but there was still one thing that needed to be determined: was this ankle fracture consistent with the alleged incident scenario?

This question was the catalyst for my retention on the matter and was one that a biomechanist may be best suited to answer. Within the radiographs provided I saw something illuminating: the involved bones in the foot and ankle were pushed together, similar to what would be expected if a force had been applied to the bottom of the foot driving it upwards. In the proposed injury mechanism, the fracture surfaces would be expected to be pulled apart from each other as the ankle would be in tension, not compression. Thus, the plaintiff's claimed injury mechanism did not align with the one objective fact of the matter, the injuries.

An interesting tangent on this matter is that in addition to asserting that the primary ankle fracture was a result of stepping on the side of the foot and pulling the torso upwards, the opposing biomechanist postulated that a fracture of the opposite ankle diagnosed months after the incident was a result of an unbalanced gait. A review of the medical records illustrated a key point that was lost in the shuffle: the first diagnosis of the opposing ankle fracture was actually the same day as the incident. While this was initially concerning, it proved to be both favorable and key to excluding the plaintiff's alleged incident scenario. Afterall, how does stepping on one foot fracture the opposite ankle?

## AN ANTI-THEFT FEATURE, OR A LIABILITY

A man walked into a large retail store with a shopping cart with the intention of buying only one item. Having wandered the store, he determined the object was not available and proceeded to exit, bypassing the checkout. As he was exiting the store, the anti-theft wheel lock on the shopping cart deployed, stopping the cart as it was designed. The man, who had been leaning on the cart at the time, proceeded to fall and fracture his hip. The Complaint stated that the wheel lock mechanism was the sole direct contributor to his fall and subsequent injuries. However, the footage from the store showed numerous wheel locks deploying on other carts, but only one fall. Thus, the question was raised: why did the plaintiff fall over, but not the other shoppers who experienced wheel-lock deployment? Within this matter, the "fact" in question was the assertion that the deployment of the wheel lock was the sole contributor to the plaintiff's fall and injuries. Given that he was the only shopper to fall as a result of the wheel lock deployment despite numerous other deployments, I was retained to analyze the plaintiff's incident and determine what the difference was in this case. A site inspection was performed which allowed for a camera match of the plaintiff's posture and gait as he traversed the store.

Using the camera match, the center of gravity of the individual was calculated, and it was determined that it was in front of his feet prior to deployment of the wheel lock feature. This indicates that prior to the wheel lock deployment, the plaintiff was using the shopping cart to extend his base of support, projecting it forward of his own two feet. Thus, when the cart stopped as designed, his base of support was reduced to only his own feet, resulting in instability and the subsequent fall. An analysis of a patron that successfully traversed the entrance when the wheel lock on their cart deployed indicated that an upright posture while pushing the cart resulted in the center of gravity staying within the base of support, mitigating instability. Therefore, the plaintiff's chosen posture and improper cart use directly caused or contributed to the incident and subsequent injuries.

So, what do you think? Should these so-called "facts" be accepted as truths, or examined as allegations that must withstand objective scrutiny? These cases demonstrate that the difference between allegation and reality often lies in details best uncovered through analysis of human movement, injury mechanics, and physical evidence. Whether disproving contact with an alleged defect, identifying an injury mechanism inconsistent with the claimed event, or revealing how a plaintiff's own posture and movement contributed to a fall, biomechanical analysis provides a powerful tool in your legal fact-finding mission.

*Grace Oswald holds a Bachelor and Master of Science from Ohio State University in biomedical engineering. Prior to S-E-A, she applied biomechanics in a variety of medical device development fields. Grace now applies her knowledge to a variety of matters at S-E-A, including investigation of premise liability claims.*