

## **URGENT INDUSTRY ACTION IS REQUIRED TO FIX THE DANGEROUS SHOE SOLE DEFECT**

### **EXTREME SOLE INSTABILITY OVERLOOKED IN FORMAL RESEARCH**

Unfortunately, there is no settled science on extreme lateral instability in footwear soles, especially the extreme outward tilting typical of lateral ankle sprains – despite being by far the most common injury requiring medical care. No peer-reviewed studies have ever been done by footwear companies or by scientific and medical researchers in biomechanics or orthopedics that investigate the true role of unstable footwear soles in the ankle spraining mechanism.

Instead, the human ankle alone has always been blamed by all for human instability. The fundamental defect in existing footwear soles has been entirely overlooked, however obvious it is now in light of the demonstrated safe natural stability of the barefoot ankle.

This costly oversight is not a surprise. It is the direct consequence of the footwear industry spending very little on R&D, only about 1/10th as much as the average of all U.S. companies. Moreover, almost all of that footwear R&D funding goes into product development, not research, and definitely not into the kind of truly basic research shown here.

Moreover, all industry product development focuses narrowly on the existing cobbler-based paradigm of shoe sole structure that has existed unchallenged for 2,000 years. The footwear industry's "high tech" is only fancy new materials and construction used on the ancient sole structure, perversely providing a glitzy veneer that covers up its grossly unsafe instability.

### **FORMAL FOOTWEAR STUDIES IGNORE CRITICAL SCIENTIFIC STANDARDS**

So, in essence, without effective research, the entire footwear industry has been flying blind, despite millions of serious sole crashes causing its wearers to fall throughout the world, every year, year after year. Worse, the formal footwear research that does exist rigidly meets only one of the well-established standards of valid modern scientific research, peer-review. But peer-review by itself reliably ensures only groupthink among the experts and little else.

Footwear research studies typically ignore more critical research standards like random sampling and valid control groups. Nor do they use double-blinding to prevent the obvious likelihood of serious placebo effects. So most footwear studies are false and misleading\*.

As a result of that vacuum in reliable formal footwear science, do footwear companies currently lack sufficient trustworthy information to safely solve its extreme instability problem? Unfortunately, the all too frequent knee-jerk reaction of global companies facing serious industry-wide problems caused by defects or pollution is to say that many more research studies are needed before any major corrective action is contemplated, much less taken.

In fact, de facto scientific spokesmen for the footwear industry have taken that position in the past relative to studies showing that barefoot populations have far fewer injuries than modern shod populations. Future studies with much more rigorous scientific methodology were demanded before any industry action, but the industry never funded any of the demanded studies.

Finally, even if the demanded formal footwear science is ever properly done, will modern shoe wearers then be trapped in the same situation that existed during the recent COVID pandemic. The problem then was that much of the "settled science" was far too complex for non-experts to understand in any meaningful way. To that inherent complexity was added unusually divided views between experts that further confused the issue of what might be the best choices for treatment and prevention. Unfortunately, most were left to trust the experts of their choice with no reliable basis upon which to base that trust, other than blind faith.

## THE BASIC SCIENCE HERE IS SO SIMPLE THAT IT IS INDISPUTABLE

Fortunately, the evidence here is undeniable, because the relevant science at issue is so remarkably simple that it is indisputable. The science actually could not be more basic! The evidence already shown proves beyond any reasonable scientific doubt that existing footwear is artificially unstable and therefore defective. Far more formal future research can and definitely should be done, but will only confirm more formally the obvious facts already made plain.

In unambiguous fact, science never gets simpler than the surprising result already shown. **The human ankle is naturally stable in the extreme sideways motion that occurs in ankle sprains and falls, unless it is artificially destabilized by defective footwear soles.**

Existing footwear soles are based on the standing footprint of a wearer used by cobblers for at least several millennia, probably far longer. Unfortunately, the standing footprint is simply too narrow to provide stable support to the naturally wider foot sole that provides structural support during the extreme sideways foot motion. That sideways motion naturally occurs often, particularly during lateral sports, but even during running and walking, or even standing.

Natural sideways motion is typically up to 20° of outward rolling supination and up to 10° of inward rolling pronation. Both sideways motions are provided by the **subtalar joint**, which is located directly under the ankle joint, between the ankle bone and the heel bone.

## THE SCIENCE IS EVEN SO SIMPLE, ANYONE CAN PROVE IT FOR THEMSELVES

In formal modern science, researchers usually have to try hard to find meaningful and statistically relevant results, and often fail to do so. But even when successful in doing so, their test results are almost never repeated by others to verify their accuracy.

It is therefore all the more surprising that the hidden stability difference is so great – absolutely unprecedented in modern science – that anyone who can stand safely can prove it for themselves in the simplest way without any equipment other than one of their ordinary shoes, but with support from a safety spotter. No experts are required. It's not rocket science – far from it.

## THE SIMPLE STANDING ANKLE SPRAIN SIMULATION TEST

As previously shown, the extreme rolled outward position of the ankle in a lateral ankle sprain forms an obvious basis for a simple **Standing Ankle Sprain Simulation Test**. Virtually anyone can perform the test, even the young child shown.

The **SASS Test** clearly shows that the barefoot is stable and the same foot in shoe is not. No need for experts with many years of graduate training or sophisticated labs with special modern equipment or difficult mathematics that might otherwise cause confusion or raise doubts about test results.

**But if you try the Test, DO NOT IGNORE THIS SERIOUS WARNING! Never try tilting out your ankle, especially in a shoe, without firm support from a safety spotter** to prevent a potentially very dangerous fall that too often results in a broken joint like a hip or a brain concussion, or even death. All frequently occur from falls in every age group.

**And do not try it if your ankle is unstable from previous injury** because such injuries are often repetitive and can lead to its permanent and serious ankle weakening that would make the **Standing Ankle Sprain Simulation Test** dangerous. Finally, don't try it if you have any other physical impairment.



In the future, no footwear sole design can be considered safe that cannot pass the simple **SASS Test**. It must be the final, either pass or fail test for any footwear before going into commercial production. No failing footwear should ever be marketed without a prominent warning of its dangerous and unnecessary instability defect!

### **THE FOOTWEAR INDUSTRY MUST TAKE IMMEDIATE ACTION!**

In light of the conclusive evidence presented here, it seems extraordinarily difficult if not impossible even to conjecture what could be a serious argument against immediate action by the footwear industry. The only possibility would seem be a deeply cynical plea to just believe whatever convoluted denial that industry experts can come up with, but definitely not your own lying eyes. Or more particularly in this case, a plea not to believe your own lying feet and shoes. The only response to that is appropriately blunt: you cannot be serious! Some facts are just too plain to cover up.

An earlier and far less subtle technological disaster offers guidance here. After the Challenger space shuttle explosion in 1986, Richard Feynman – perhaps the greatest scientist of the recent era – made a critical observation during the long and painstaking investigation into the explosion’s cause. He said that “**for a successful technology, reality must take precedence over public relations, for Nature cannot be fooled.**” He further concluded that “**science is the belief in the ignorance of experts.**”

So it is here. Simply put, **the irrefutable and easily reproducible evidence of the natural stability of the human ankle when barefoot absolutely proves that the well-known ankle instability when in a shoe is completely artificial. That gross instability is due to the hidden defect universally present in existing shoe soles, not to human ankles, which are only its victims.**

The gross defect can and must be corrected in every type of shoe. And corrected as soon as possible, given its huge and avoidable cost in lives and medical care. In the U.S. alone, that is a **conservatively estimated 20,000 deaths and \$65 billion in medical costs each year.**

Consequently, there can be no valid defense of the status quo in sole safety by the footwear industry. No delay can be justified by the industry. It must begin working immediately with the greatest possible urgency to finally correct the now obvious sole defect, since proven solutions already exist. Failure to do so is not an option.

**\*** For more on false and misleading formal footwear studies, see the Appendix to my book, **UNNATURAL INSTABILITY**. The Appendix is an investigation of the surprisingly primitive state of functional design in modern athletic shoes, with many examples. See particularly pages 10-15, which point out that formal footwear research consistently fails account for potential placebo effects, even when the potential for those effects is extraordinarily high. Double-blinding can eliminate the placebo effect but is not used. In addition, pages 25-27 cover

the footwear industries' important failure over many decades to investigate significant evidence of excessive injury rates in populations that wear modern shoes compared to barefoot populations.

See also the Appendix to the Summary of my second book, **UNNATURAL MISALIGNMENT & DEFORMITY**. That second Appendix presents what I believe is conclusive evidence that existing biomechanical studies on running are false and misleading because of consistent and fundamental failures to use critically important scientific research methods. Among many others that are inexcusable, the principal shortcomings are failure to use random selection of test subjects, valid control groups, and double-blinding.

Compelling additional information on the instability defect problem and much more detail on its proposed solutions is included in the full first draft of the new book, **UNNATURAL INSTABILITY**, which is available without cost in the **Research** section of the website, [www.AnatomicResearch.com](http://www.AnatomicResearch.com).