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Fit is the principal factor if running shoes are to enhance an athlete's performance and help prevent injury. Cushioning can have the opposite effect.

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…and it could be said…

Professor Brüggermann's views will doubtless not be well received by at least one section of the footwear industry: the major sports shoe brands. Between them, they have invested millions of dollars in developing shock absorbing ideas that they claim will both enhance performance and reduce the chance of injury. Whether any of them really work or just help to increase sales has long been a matter of conjecture for the rest of the industry. Whatever your views, however, the sports brands have certainly achieved considerable commercial success through them.

The majority of running shoe midsoles were traditionally made of EVA with occasionally some additional rubber or polyurethane for greater durability. EVA worked quite well, was cost effective and easy to use. But, it was a bit boring wasn't it? Then came the air bag and everything suddenly took-off. Some people then said gel sacs were better, while yet others claimed flow or grid systems were the answer. All referred knowingly to pronation leading to muscle strain followed by stress injuries and how cushioning systems—and theirs in particular—were the best solution. Consumers might well have been confused but, as is the way of these things, they bought into the concept because that's what everyone did—didn't they?

There is even a running shoe built without a heel so that you have to run on the balls of your feet. The inventor may have a point, as he manages to win quite a few marathons wearing them despite being nearly 50 years old. Now Professor Brüggermann has brought a welcome breath of fresh air to the debate. Common sense tells you that it is easier to walk—let alone run—in a properly fitting shoe. Ask any qualified shoe fitter if you can still find one. Common sense unfortunately does not sell sports shoes. Good marketing or 'spin' however can sell anything provided it tells people what they want to hear. Welcome though his comments are to some, he faces an uphill struggle to convince the rest.

The professor concluded: "Impact leads to an increase of the bone mass. This means that the whole concept of cushioning is failed."

Cushioning affects pronation, the way the foot rotates when we leave a standing position, which can leave the ankle joint and the medial side of the knee susceptible to higher force and, in excessive cases, even lead to a valgus deformity. Joints and Achilles tendons can become decoupled. Even if there is only a small possibility of an athlete's condition or running style leading to injury, excessive use can increase the chances substantially. You can feel it, Professor Brüggemann insists: cushioned shoes can cause internal tibia rotation, which affects the mechanics of the knee and other joints.



Professor Peter Brüggemann of the German Sport University in Cologne.
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"So is it the case that high levels of pronation must lead to injury? We can't say that," he continued. "It's not necessarily the case. But the locomotor system does not react systematically to interventions with shoes. If a shoe increases foot pronation, it decreases locomotor control. If the foot is unshod, it behaves in a different way compared to a foot with a shoe on. The initial plantar flexion is different. You can also affect the muscles that counteract pronation."

For all these reasons, motion control concepts really should "consider the sagittal plane", the body's natural way of holding itself and of moving, and not rely entirely on mechanical support. He said footwear manufacturers should concentrate their efforts to enhance performance by improving fit and finding ways to minimise energy loss. On the subject of protection, he argued that it was a mistake to engineer in devices that stop athletes from using their joints and muscles in the way that nature intended; a good shoe should help them use those parts of their anatomy better so that, in training, athletes can use their shoes as a work-out tool. He offered the Flexor hallucis longus muscle as an example. "Load that muscle [the largest and most powerful of the deep muscles in the posterior compartment of the leg], and it will become more developed, more powerful," Professor Brüggemann explained. "A flexible shoe can help you do that."

None of this means shoes should lack comfort, but he made the point again that the number-one factor that athletes have offered to him in terms of comfort is fit. If a shoe fits well, it will help runners lower their energy consumption. "I have only been able to give a rough overview," he said at the end, "but I think there is a radical footwear discussion to be had on this subject from a more scientific point of view."