




Computer helps design shoe that walks on air

The first Air Shoes Invention

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Computer Helps Design Shoe That Walks on Air

In a collaboration between a computer and a former Olympic athlete, a shoe that allows one to "walk on air" has been designed. Dr. Gideon Ariel and his company, Computerized Biomechanical Analysis (CBA), have created a shoe that uses air to cushion each step, reducing strain on the foot, leg, and lower back. The design was born from a study commissioned by the U.S. Bureau of Standards to investigate the efficiency of common shoe designs. The study found that the most efficient way to walk is barefoot, with a rolling motion that pushes the body forward. The air shoe mimics this motion, providing a cushioned step and a rolling effect when walking or running. The design has been acquired by the Pony Shoe Company and is expected to be used in various sports and potentially by the general public. CBA has also designed a new exercise machine and a tennis racket with a pivoting handle, among other products.

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Below find a reprint of the 1 relevant pages of the article "Computer helps design shoe that walks on air" in "Daily Hampshire Gazette":

Computer helps design shoe that walks on air

By MILTON COLE
AMHERST — Walking on air. The very thought is so pleasurable that the expression is used constantly to describe emotionally inspiring success. But now a computer and a former Olympic athlete have merged knowledge and technology so they could make "walking on air" a reality.

Dr. Gideon Ariel of Beltschoren and his Computerized Biomechanical Analysis company in Amherst have designed shoes in which one does walk on air.

How efficient the shoe
 They are the result of a survey on how efficient is the design of shoes in general, and how can they be made more efficient.

The result of that survey and study could be shoes that have one walking on air.

And if the air-shoes are the most unusual of the products of CBA, they are not the only ones.

For example, there is a new exercise machine that makes it unnecessary to have a large room to house it, and makes it possible to do all your exercises in half the average-size bathroom.

There is a tennis racket with a pivoting handle that enables a player to absorb the shock of a ball hit at him and return it with maximum force and accuracy.

And there is a study being made for the Department of Defense on how to make the foot soldier more efficient as far as equipment and uniforms are concerned, and what is the most efficient way to hold and shoot a sub-machine gun.

There are some of the more unusual studies that have been or are being made. But there are others, enough others that the business started by Ariel six years ago has now grown into a multi-million-dollar firm that is expanding.

Take the air shoe
 Originally the U.S. Bureau of Standards contracted with CBA several years ago to do a survey on the efficiency of design of the common shoe.

The study, including filming of people walking and then slowing the film down to analyze frame-by-frame what happens when a person takes a step, showed that the common shoe is not an efficient design.

The protruding heel causes a person to step onto the heel of the foot first, putting the strain of each step on it, and then expanding that strain up through the leg into the lower back.

It showed that the way we walk and the kind of shoes we walk with can be a cause of lower back trouble as well as the cause of foot and leg problems.

The computer showed that the most efficient way to walk is the way we walk barefoot, with a rolling motion so that the force we generate as our foot hits the ground will cause a rolling motion, pushing the body forward on the foot, instead of jarring the force on the leg.

How to utilize that knowledge?
 After the report was sent to the federal agency, Gideon and his partners at CBA worked on putting theory into reality.

One shoe was designed aimed at providing the rolling motion, but still sending some of the jarring motion up the legs. Then came the idea of using that jarring action to provide forward motion.

The air shoe was born. The prototype is designed for athletes, and has been used successfully in practice by the members of the U.S. women's volleyball team.

They have found that their jump higher, and they end up with fewer leg problems, muscle pulls, etc. as a result of landing on their feet after a jump.

Basketball players are experimenting with them, along with runners.

The design is of a regular nylon-bodied running shoe, with the rubberized cupped or cleated sole.

But the inside has another rugged rubberized insert running the entire length of the shoe. In the outside of the heel of the shoe is a small air intake valve.

A rubber-bulb pump is inserted into the valve and the insert is filled with air, like filling an auto or bicycle tire or a football or basketball.

Then the shoe is put on, laced and tied. And when one walks on it, he or she is literally and actually walking on air.

Air forced out
 Each step forces the air from one spot in the insert into another by use of computer-designed valves, and the result is a cushioned step whether walking or running or jumping, and a rolling effect when one walks or runs.

They should end problems with leg muscles, shin splints, bone spurs, etc. And they should cut foot fatigue for runners," Ariel said.

Right now the design has been acquired by the Pony Shoe



PUMPING UP the sole prepares the new "air shoe" for use. It was designed by Computerized Biomechanical Analysis in Amherst, and CBA president Dr. Gideon Ariel is getting the shoes ready. (Richard Carpenter Photo).



DR. GIDEON ARIEL demonstrates how the computerized exercise machine his Computerized Biomechanical Analysis firm of Amherst designed, with computer operating hydraulic piston to provide the same resistance as weights used on traditional exercise machines. (Richard Carpenter Photo).

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