



## **New Study: Adaptive Motion Trainers Can Put Significant Stress on Knees, May Not Be Best Option for Those with Knee Pain**

*Research shows traditional non-impact cardio machines can cause patellofemoral joint stress at levels equivalent to squats, stair climbing and lunges*

**MEDWAY, MA – March 12, 2012** – New research conducted by the University of Wisconsin - La Crosse Department of Physical Therapy calls into question the conventional wisdom that non-impact cardio machines, such as adaptive motion trainers (AMTs), apply minimum stress to the joints. The study shows that some cross trainers, particularly ones that move in an elliptical-like pattern, may still impose high stresses on the knee. The research was funded by the [Cybex Research Institute](#) (CRI), research division of Cybex International Inc. (NASDAQ: CYBI).

“What we’re learning is that shock is not the only relevant factor in reducing knee stress,” said Dr. Paul Juris, executive director of CRI. “Even in low or non-impact motion, compression at the patellofemoral joint – just under the kneecap – can be significant. With millions of people suffering from knee pain, this research comes at a critical time.”

### Important Facts:

- Anterior knee pain is the most common complaint among physically active adults and children and accounts for 62% of all knee injuries.<sup>1</sup>
- Patellofemoral Pain Syndrome (PFPS) accounts for 57% of all knee problems in runners. 2.5 million runners are diagnosed with PFPS in a calendar year.<sup>2</sup>

As the problem persists, people are migrating to non-impact forms of exercise like ellipticals and AMTs assuming that it's a safe alternative. However this new research shows that non-impact cross trainers are not stress-free, and that patellofemoral stress occurs at levels significantly greater on some devices than on others.

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<sup>1</sup> Scott, S.H. and Winter, D.A. (1990). Internal forces at chronic running injury sites. *Medicine and Science in Sports and Exercise*. 22(3): 357-369.

<sup>2</sup> Strother, R.T. and Samoil, D. (1989). Patellofemoral syndrome: therapeutic regimen based on biomechanics. *Canadian Family Physician*. 35: 1649-1654.

In the University of Wisconsin study, 16 subjects exercised at 75% of their age-predicted maximum heart rate on the Cybex Arc Trainer and Precor AMT cross trainer, at a constant pace of 100 steps per minute. An instrumented foot plate measured pedal reaction forces and an eight-camera infrared motion capture system measured pedal position, body position, and joint angles. Based on this information, peak patellofemoral joint forces (PFJFs), measured in Newtons per kilogram (N/kg), were calculated to be 141 percent greater on the AMT compared to the Arc Trainer. While the values for the AMT (19 N/kg) were comparable to that of stair climbing (21 N/kg) and lunging (19 N/kg), the Arc Trainer (8 N/kg) was more comparable to walking (9 N/kg). The Arc Trainer allowed users to maintain a high-level workout with PFJFs less than half that of the AMT.

“The study found that new engineering has improved the way our bodies interact with exercise equipment,” Dr. Juris added. “The Arc Trainer’s design minimizes the stress put on users’ knees while maintaining a highly efficiency workout.”

To learn more or to download the full report, visit the Cybex Research Institute online at [www.TruthOnFitness.com](http://www.TruthOnFitness.com) or meet with CRI staff at the International Health, Racquet & Sportsclub Association ([IHRSA\) Convention](#) March 14-17 in Los Angeles, or the [FIBO](#) trade show April 19-22 in Essen, Germany.

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### **About Cybex**

Cybex International, Inc. is a leading manufacturer of premium exercise equipment primarily for commercial use. The Cybex product line, including a full range of strength and cardio training machines, is designed using exercise science to reflect the natural movement of the human body. Led by the [Cybex Research Institute](#), Cybex fitness equipment is engineered to produce optimal results for users from the first-time exerciser to the professional athlete. Cybex designs and builds its products in the USA for a wide range of facilities, from commercial health clubs to home gyms, in more than 85 countries worldwide. For more information on Cybex and its products, visit the Company’s website at [www.cybexintl.com](http://www.cybexintl.com).

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