



# Ariel Dynamics Inc. Media Library - Video

## Future Watch



<b>Code</b>	adi-vid-01009
<b>Title</b>	Future Watch
<b>Subtitle</b>	To the Rescue, Computers in the Gym
<b>Description</b>	Interview with CNN about the Computerized Exercise Machine.
<b>Subject</b>	ACES;Exercise Machine
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## FutureWatch: Computer-Assisted Training and Rehabilitation

Donna Kelly introduces us to the world of computer-assisted training and rehabilitation. Dr. Gideon Ariel, a former champion discus thrower, uses computers to study the body's performance and guide athletes towards stronger bodies. His clients include golf greats like Nicklaus, baseball star Nolan Ryan, and tennis giant Andre Agassi.

Dr. Ariel uses video imaging and computer analysis to diagnose and improve an athlete's performance. He identifies coordinates the computer can read, and then transforms the human into a matchstick figure. This technology can also be used to prevent workplace injuries by identifying stress on the lower back or knees when lifting heavy objects.

Dr. Ariel's technology is also used in the field of rehabilitation. His company is attempting to sell exercise and rehab machines to hospitals and clinics. These machines, connected to a computer, can sense a patient's pain and adjust the weight accordingly. This reduces the risk of re-injury and helps the patient recover faster.

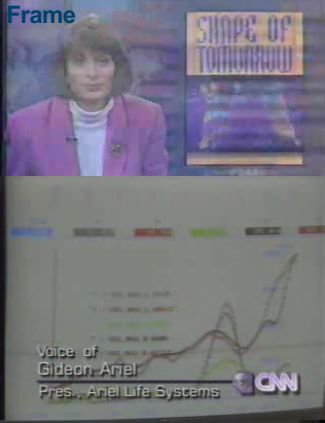

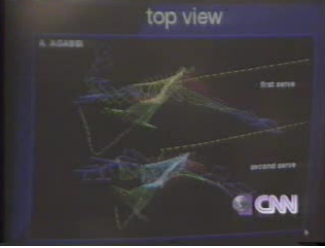



NASA has shown interest in Dr. Ariel's work. In 1995, they plan to place a modified version of his equipment aboard a shuttle flight to study how fast astronauts' muscles deteriorate on long flights.







While the Ariel system is not yet affordable for the average household, the cost has significantly dropped from the million-dollar range to about \$60,000 due to advancements in computer technology.





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## Audio transcription

Frame	#	Time	Spoken text
	0.	00:00:00	Hello, I'm Donna Kelly, welcome to FutureWatch.
	1.	00:00:05	At times it seems everyone's in a gym these days, either getting into shape or recovering
	2.	00:00:11	from an injury, but many of us risk injury if we don't follow some guidelines to the
	3.	00:00:16	rescue, computers that once helped professional and Olympic athletes.
	4.	00:00:20	As Brian Nelson reports, they're now ready to guide weekend warriors towards stronger
	5.	00:00:25	bodies as well.
	6.	00:00:27	A gold medal discus thrower showing his Olympic form.
7.	00:00:33	But under the computer microscope of Dr. Gideon Ariel, he's reduced to a set of matchsticks.	

Frame	#	Time	Spoken text	
	8.	00:00:39	And then graft is if you were a blue chip wall street stock.	
	9.	00:00:43	Look what happened here.	
	10.	00:00:44	He's reaching maximum velocity here with the leg, this is the leg, this is the hand.	
	11.	00:00:50	And then he starts slowing down.	
	12.	00:00:52	While he's slowing down with the leg, the arm starts feeding up.	
	13.	00:00:56	Gideon Ariel is describing the transfer of physical energy.	
	14.	00:01:00	A champion discus thrower himself in Israel, he came to the US in the 1960s to study biomechanics.	
		15.	00:01:07	The young athlete harnessed computers to help him study the body's performance, and soon
		16.	00:01:12	found himself with a stable of star clients eager to become better.
		17.	00:01:17	Golf greats like Nicklaus, baseball great Nolan Ryan, and even young tennis giant, Andre Agassi.
		18.	00:01:25	Will he be able to help him improve his serve?
		19.	00:01:28	Absolutely.
		20.	00:01:29	We also walk with Jimmy Connors before and we improve his serve from about 70 miles an hour
		21.	00:01:33	to close to 100 miles an hour.
22.		00:01:35	Ariel will tape a video image of his subject, feed it into his computer, and begin the diagnosis.	
23.		00:01:41	His early field of interest with sports, today he's heading into the workplace.	
24.		00:01:46	Let's take a situation when a person is just lifting a box, he or she is lifting a box.	
	25.	00:01:54	He is in a walk environment when she has to lift this type of box.	
	26.	00:01:58	Well how we know what the stress on the lower back or on the knees?	
	27.	00:02:02	What Ariel does is to identify coordinates the computer can read, and then let the human	
	28.	00:02:08	become a matchstick figure.	
	29.	00:02:09	He highlights the left and right knees, and the computer does the rest.	
	30.	00:02:15	And how much he bent on his, okay it's easy to calculate just by looking you cannot tell.	
	31.	00:02:19	So basically we will find from this point which was a full extension, to this point	
	32.	00:02:25	which was full flexion, she bent on his 128 degrees.	
	33.	00:02:30	And she was quite symmetrical.	
	34.	00:02:31	Now what can you use this information for, for Workman's compensation for example?	
	35.	00:02:35	Yeah let's say that she had to enjoy it one on the knee, so she couldn't bend both knees	
	36.	00:02:39	the same way, so she had to compensate with the body, she might create a new injury and	
	37.	00:02:43	we can tell her don't do this work because you don't use the knee symmetrically.	
	38.	00:02:48	That's the middle of time before she developed also a back problem, and then neck problem	
	39.	00:02:52	is like a kinetic link.	
	40.	00:02:55	And that brings us to the field of rehabilitation.	

Frame	#	Time	Spoken text
	41.	00:02:58	Ariel has matched his computer to a set of exercise in rehab machines, which his company
	42.	00:03:02	is now attempting to sell to hospitals and clinics.
	43.	00:03:06	Suppose you're trying to get into shape in a conventional gym like this one, or perhaps
	44.	00:03:09	just recover from some sort of injury.
	45.	00:03:12	You're going to want to hire a personal trainer, or you're going to rely on a lot of guesswork.
	46.	00:03:17	For example, you'll start with a weight that you hope won't hurt or re-injure you.
	47.	00:03:21	If it does, you're going to reduce it, and if it doesn't, you'll add some more.
	48.	00:03:25	Well as I said, there's a lot of guesswork, and it can also be kind of risky.
	49.	00:03:29	But what if you were able to plug a computer into a machine like this like Dr. Ariel does?
	50.	00:03:34	Well the computer, theoretically anyway, would begin to sense your pain at just the moment
	51.	00:03:38	you start to feel it, and reduce the weight.
	52.	00:03:41	As you move through the area of hurt, it would then re-impose the weight for the rest of
	53.	00:03:45	the flex.
	54.	00:03:46	And we'd do that until you feel stronger.
	55.	00:03:48	Go.
	56.	00:03:50	And push push push push.
	57.	00:03:52	Ariel placed a recent brain surgery patient into his leg extension machine, and the computer
	58.	00:03:57	was able, in a matter of seconds, to uncover a weakness.
	59.	00:04:00	He stopped, and he stopped, and he stopped.
	60.	00:04:03	He has problems with this particular knee, or a particular leg, maybe not the knee.
	61.	00:04:07	One more?
	62.	00:04:10	That's it.
	63.	00:04:15	After spotting a weakness, Ariel's creation writes itself a prescription, and begins
	64.	00:04:20	to work with the patient.
	65.	00:04:22	He put this bummed knee corresponded onto his so-called squat machine.
	66.	00:04:25	I really love that your knee is through the whole range of motion.
	67.	00:04:29	You were scared to do this exercise, but now you gain confidence, because you have a guard.
	68.	00:04:34	There is a guard here that's actually protecting you from getting hurt.
	69.	00:04:38	And in fact, in this area, for whatever the reason is, you let go a little bit, so the
	70.	00:04:42	computer adapt to you.
	71.	00:04:44	Not only will the machines go easy on infirm TV correspondence, they can get tough on real
	72.	00:04:50	athletes.
	73.	00:04:51	Let's say that I know that you are a high jump, and I know that you have to produce

Frame	#	Time	Spoken text
	74.	<b>00:04:54</b>	<i>so much force in order to jump two meters.</i>
	75.	<b>00:04:57</b>	<i>Well, if you don't produce the force, this thing will not move, so you have to produce</i>
	76.	<b>00:05:02</b>	<i>the force, so I can do it either way.</i>
	77.	<b>00:05:04</b>	<i>Ariel's work is drawn the interest of NASA.</i>
	78.	<b>00:05:06</b>	<i>Scientists have conducted gravity-free tests of his equipment, and in 1995, will place</i>
	79.	<b>00:05:12</b>	<i>a modified version aboard a shuttle flight to study how fast the astronauts' muscles</i>
	80.	<b>00:05:17</b>	<i>deteriorate on long flights.</i>
	81.	<b>00:05:20</b>	<i>Further off in the future, Ariel hopes to see his machines in every health-conscious</i>
	82.	<b>00:05:25</b>	<i>sports medicine data banks, offering computerized personal training and rehabilitation, all in</i>
	83.	<b>00:05:31</b>	<i>the privacy of the spare room.</i>
	84.	<b>00:05:34</b>	<i>Brian Nelson, CNN FutureWatch.</i>
	85.	<b>00:05:37</b>	<i>The Ariel and similar systems are not yet priced for the average household, but because</i>
	86.	<b>00:05:42</b>	<i>of the explosion in computer technology, their cost has fallen from the million dollar range</i>
	87.	<b>00:05:47</b>	<i>to about \$60,000.</i>

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