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History of Biomechanics

Code	**adi-vid-01175**
Title	History of Biomechanics
Subtitle	Part 4 - The Birth of the USOC Colorado Springs Training Center
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Synopsis

The U.S. Olympic Training Center was initially established in Squaw Valley but was later moved to Colorado Spring due to altitude issues. The first Olympic Committee was also selected and the Koto Research Center was designated as an Olympic site. The chairman of biomechanics for the U.S. Olympic Committee was chosen and the computer of the United States Olympic Sport Medicine Committee was established.

Al Oder, a former gold medalist, and Dr. Gideon Ariel, the chairman of biomechanics, discussed the potential of computers in athletics. They predicted that sophisticated computing capabilities would revolutionize sports, with athletes being able to simulate perfect throws and receive immediate feedback on their performance.

However, they also warned about the potential dangers of over-reliance on technology, such as the possibility of implanting computers within athletes to override their natural limitations. They emphasized the importance of maintaining a balance between arts and science in sports and using technology to enhance, not replace, natural athletic abilities.

The U.S. Olympic Committee's budget for the 1984 games was more than $71 million, five times the amount spent on the 1976 games. They utilized the science of biomechanics, as refined by Dr. Gideon Ariel, to give the U.S. team a competitive edge. This involved analyzing the angle of each joint in an athlete's body and identifying errors that could not be detected by the human eye alone.

The biomechanics computer was also used to analyze the performance of competitors and learn from their techniques. The U.S. women's volleyball team, for instance, improved their performance by working with the analysis of the Japanese champions. The effectiveness of this "secret weapon" would be tested in the 1984 games.

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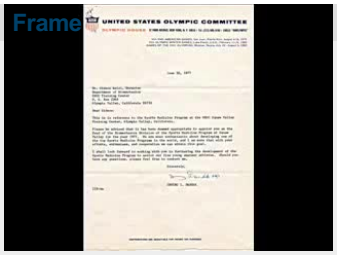
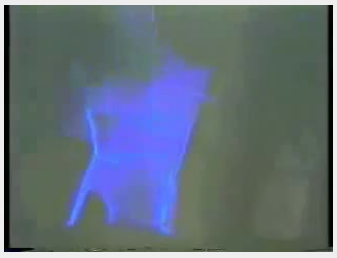
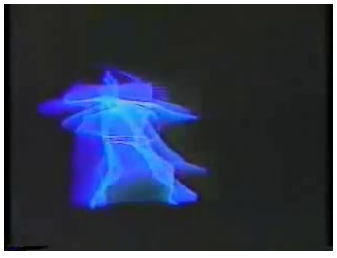
Audio transcription

Frame	#	Time	Spoken text
	0.	00:00:00	*started the U.S. Olympic Training Center. The first one was in Squaw Valley.*
	1.	00:00:05	*It didn't situate very well because of the high altitude and then we move it to Colorado Spring.*
	2.	00:00:12	*We selected also the Olympic Committee, as you see here, that's the first Olympic Committee,*
	3.	00:00:18	*and then you see them in my center in Koto Research Center, which was designated by itself*
	4.	00:00:24	*as an Olympic site. Artets used to come to train there before Colorado Spring.*
	5.	00:00:29	*Then I was chosen as the chairman of biomechanics for the U.S. Olympic Committee,*

Frame	#	Time	Spoken text
	6.	00:00:34	*as you see here in these certificates, and the first I start working what's called here the*
	7.	00:00:41	*computer of the United States Olympic Sport Medicine Committee with my friend Al Other,*
	8.	00:00:47	*the former gold medalist that I compete with in 1960 and 64, and continue to work with the*
	9.	00:00:53	*Eman Colada Spring. These belong to perhaps the greatest Olympian in history.*
	10.	00:01:08	*My name is Al Oder. I've been in computers for about 22 years now, and I think I've always*
	11.	00:01:13	*realized that there would be the potential for the computer in athletics. We've gone through*
	12.	00:01:18	*microcomputers and many computers, and now that we're developing computer chips with*
	13.	00:01:23	*sophisticated computing capabilities, we're going to see a large introduction in the sport.*
	14.	00:01:28	*They are setting the pace. Al Oder, 45-year-old discus genius who still is a threat to everybody*
	15.	00:01:34	*in the world. And Dr. Gideon Ariel. I'm delighted to have you on the show obviously, but why is a*
	16.	00:01:39	*guy 45 years old throwing a discus and why are you still beating most of the people in the world?*
	17.	00:01:44	*I have yet to figure that out, but I enjoy it. I've always had a philosophy that you don't have*
	18.	00:01:51	*to go out and win everything, as long as you enjoy it and you work hard, you know, the capability*
	19.	00:01:55	*evolves, and that normally takes care of the winning kind of thing. I absolutely enjoy throwing.*
	20.	00:02:00	*I'm going to be throwing to another 25 years. Gideon, 45 years of age, I've alluded to that,*
	21.	00:02:05	*and yet a couple of years ago he had a combination three of the best throws. Are we beginning to*
	22.	00:02:10	*shrink chronological and biological age, or are we beginning to expand the difference?*
	23.	00:02:15	*Our body going by our genetic capability, and apparently at the age of 45 you don't have to say*
	24.	00:02:21	*I'm old man. As far as I'm concerned, all right now it's probably 25, 26 years old, biologically.*
	25.	00:02:27	*What kind of logically? That's for the birds. Did you know about Al before you started going?*
	26.	00:02:33	*Al was my idol. In fact, in the kibbutin, I had his picture above my bed every morning. I would*
	27.	00:02:40	*worship. I mean, thousands years ago, they would kill me, they would say that I worship idols,*
	28.	00:02:45	*you know, but he was my idol for many, many years from 1955. All right, that was time for you.*
	29.	00:02:50	*That's a long time ago. You're getting older, you're getting younger. Al, you have a scientific*
	30.	00:02:57	*interest. Where'd that come from? Well, I've been in computers now for whole 20, 21 years,*
	31.	00:03:02	*or something like that, and when I started back into competition, I had an eight-year*
	32.	00:03:06	*layup from 1968 through 76, and when I started back, I thought I might as well learn as much*
	33.	00:03:12	*as I can about the throw, and I hooked up with Gideon immediately to find out exactly what I*
	34.	00:03:17	*was doing wrong. Why not take advantage of all of the innovations that occurred through that*
	35.	00:03:22	*eight-year span? And I think the computer analysis of the technique in my event was actually the*
	36.	00:03:28	*most important thing. I could determine for the first time what coaches were trying to tell me.*
	37.	00:03:32	*I could see quantitatively where I was accelerating, decelerating, all these kinds of things,*

Frame	#	Time	Spoken text
	38.	00:03:36	*and then going through that analysis, I was able then to launch into my kind of newfound career,*
	39.	00:03:42	*okay, with new enthusiasm and knowing what I was doing. Al, to understand the future,*
	40.	00:03:46	*we have to understand the past. Unfortunately, or fortunately, you're the past and the present*
	41.	00:03:51	*and the future. Now, where are we going to go with this game? I think the computer analysis will*
	42.	00:03:56	*continue. I think we'll get into very shortly an area where athletes will be able to almost*
	43.	00:04:03	*step inside themselves. We'll have computers simulating what the perfect throw will be,*
	44.	00:04:07	*and throwers will be, in effect, able to enter their own image created by film, by computers,*
	45.	00:04:13	*and as they execute the throw, if an arm goes out too far ahead tilt to something,*
	46.	00:04:17	*there'll be an alarm go off and say, you're changing. So feedback systems and computers are*
	47.	00:04:22	*going to be very important. You see that getting? Well, hologram is the thing of the future,*
	48.	00:04:26	*and I tell you, I'm learning from Mal, more than he learned from me, but he's the head of the*
	49.	00:04:30	*game all the time because he really talked about the future. We're talking about holography now,*
	50.	00:04:36	*where you will have the ideal model that you actually will see. You cannot touch it because*
	51.	00:04:40	*you see it, but you cannot touch it, but you can put your body right in it, and every time you*
	52.	00:04:45	*depart from efficiency, either you will have some kind of feedback in alarm system, or I don't know,*
	53.	00:04:50	*maybe he needs Germany to give you a 220. There are things that are a little frightening about*
	54.	00:04:56	*the entire environment of computer introduction at the sport, because computers, 10 years ago,*
	55.	00:05:01	*I couldn't lift computers that night now I hold in the palm of my hand very easily,*
	56.	00:05:06	*and why not in the future be able to implant computers within an athlete,*
	57.	00:05:10	*and through telemetry, exercise that athlete, because the thing that prevents a runner from*
	58.	00:05:14	*going very fast, is his brain, and through telemetry, you can override that brain feedback that says,*
	59.	00:05:21	*I think I'm going too fast, wrong fatigue, you can override that with computer implants that*
	60.	00:05:24	*are stimulating various muscles, that's frightening, because then we're into robotics.*
	61.	00:05:29	*Well, is that going to be legal? You see a lot of changes taking place in the Olympic rules,*
	62.	00:05:33	*etc. Oh, the technology is here today. Certainly there's going to have to be a way of combating*
	63.	00:05:39	*it, because then you'll have coaches up in the stands, okay, with telemetry stations activating*
	64.	00:05:44	*their athletes, there obviously has to be a stop for that, how you do it is through some kind of*
	65.	00:05:48	*body scan. All I 100% agree with you, because we are here dealing with a balance between*
	66.	00:05:53	*arts and science, and when one taking over, you have a situation which is really a*
	67.	00:05:59	*non-athletics anymore, and we should use science to amplify our mind in a way where you can perform*
	68.	00:06:07	*the best, but it should be the non-invasive method, we should never implant chips in our*
	69.	00:06:12	*body, we should never take drugs, we should do it as natural as possible to achieve our maximum.*
	70.	00:06:16	*Sure, just enhance an athlete's capability to exercise more efficiently, to be more productive*
	71.	00:06:23	*in his training environment, that's all we want. Vic, while we were setting up our*
	72.	00:06:28	*comrades during our visit, he unloaded this source during training. Although the troll*

Frame	#	Time	Spoken text
	73.	**00:06:34**	*landed on a hill, we were able to calculate that the source would have travel approximately*
	74.	**00:06:40**	*244 feet, that's farther than the world record, 244 feet. This guy is going to be*
	75.	**00:06:48**	*47 years old in 1984, that's the year of the electric troll.*
	76.	**00:06:53**	*Other athletes we won't quit, with all events, you'll see our fuel buck and*
	77.	**00:06:58**	*make regions, the world I could hold them in the shot, and the viscous, which we*
	78.	**00:07:02**	*will be able to help every four years, but to the athletes, that quadrennial event is a matter*
	79.	**00:07:07**	*of just about perennial preparation, and these days, as Harold Down now reports from the US*
	80.	**00:07:12**	*Olympic Committee National Training Center, the stopwatch and tape measure are supplemented by the computer.*
	81.	**00:07:22**	*It's almost as if the United States Olympic Committee is preparing for war and not gains*
	82.	**00:07:26**	*in 1984. The budget is more than $71 million, almost five times the amount spent on the 1976*
	83.	**00:07:33**	*games, and they will make maximum use of what they call their secret weapon. The science of*
	84.	**00:07:38**	*biomechanics is not new in itself, but as refined and perfected by Dr. Gideon Ariel,*
	85.	**00:07:44**	*an Israeli-born computer science expert, it puts the US team years ahead of its competitors.*
	86.	**00:07:49**	*I think we've got the secret weapon here, and we're going to be pleased German and the Russians.*
	87.	**00:07:54**	*It is a painstaking process taking several hours to set up a sequence of motion pictures,*
	88.	**00:07:59**	*transferring frame by frame the angle of each joint from the angle to the elbow,*
	89.	**00:08:04**	*from the film to the computer, finding errors that cannot be seen by the camera or the human eye*
	90.	**00:08:09**	*alone. Al order has won four Olympic gold medals during the discus. He has set six world records.*
	91.	**00:08:15**	*This is also Al order after his technique was processed by the biomechanics computer,*
	92.	**00:08:20**	*which not only showed him what he was doing wrong, but also told him exactly how to throw*
	93.	**00:08:24**	*the discus further than anyone has ever thrown it before. He was able to draw on the computer*
	94.	**00:08:29**	*250 feet. This is over 10, almost 18 feet, better than the world record. He has it in his body,*
	95.	**00:08:37**	*the motor got it. Now we have to tune it. It's a matter of tuning. I think the results show that*
	96.	**00:08:43**	*I am throwing better. I don't think I'm throwing up to my potential. I know the computer says I*
	97.	**00:08:50**	*should be throwing around 250. Now whether it can throw 250, you know, there's something that's up*
	98.	**00:08:55**	*here. But the analysis is telling me how to work more productively. Not only is the biomechanics*
	99.	**00:09:03**	*computer being used to analyze the performance of American athletes, it's also a tool to determine*
	100.	**00:09:09**	*if the competition has any secrets the team ought to know. One thing for sure, the East German*
	101.	**00:09:14**	*and the Russians and the best analysts in the world will not be able to keep what hypothetically*
	102.	**00:09:18**	*calls secrets from our sports medicine program because we will analyze them and we'll know what*
	103.	**00:09:24**	*they're doing. And if they're doing better, we'll learn how to do it even better than them.*
	104.	**00:09:28**	*The US women's volleyball team has already benefited working with the analysis of the Japanese*
	105.	**00:09:33**	*champions. A few years ago, this team wasn't even considered competitive. Now it's one of the top*

Frame	#	Time	Spoken text
	106.	**00:09:38**	*rated in the world. Olympic athletes will be coming here for intensive work with the biomechanics*
	107.	**00:09:43**	*laboratory between now and the 1984 games. That's when they'll find out for sure if the secret weapon*
	108.	**00:09:49**	*really works. Harold Dow, CBS News, Colorado Springs. That's our report for this Monday.*
	109.	**00:09:56**	*Until tomorrow, Dan Rather, CBS News, reporting from Washington.*

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