Ariel Dynamics Inc. Media Library - Video

Lowell Shoes

Code	**adi-vid-01018**
Title	Lowell Shoes
Subtitle	Analysis of Products
Description	Design new nursing shoes for the Lowell Shoes company.
Subject	Shoes
Duration	00:05:40
URL	https://arielweb.com/videos/play/adi-vid-01018
Date	2013-01-16 15:40:37
Label	Approved
Privacy	Public

Coto Research Center: Biomechanics and Shoe Design

The Coto Research Center in Trebucco Canyon, California, led by Dr. Gideon Ariel, is a leading institution in the field of biomechanics. The center uses advanced technology, including high-speed photography and sensor measurements, to understand human locomotion and the factors that influence movement.

The process involves using an electromyograph (EMG) and a kissler force platform to measure muscle activity and the forces exerted during movement. This data is crucial in designing optimized athletic equipment, particularly shoes.

Dr. Ariel explains that the science of biomechanics allows them to measure forces in biological systems, which is essential in optimizing shoe design. Factors such as absorption, flexibility, energy loss and recovery are considered in the design process.

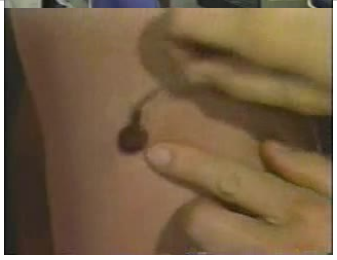
The center uses high-speed cinematography and force platforms to measure the interaction between different surfaces and shoes. The data is then analyzed by computers to generate stick figures that duplicate the actual movement. This real movement analysis, not simulations, is key in improving performance, reducing injury, and designing better products.

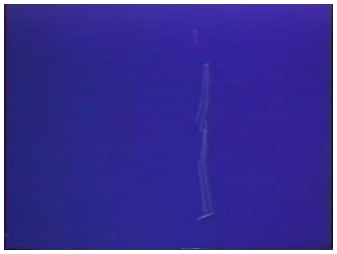
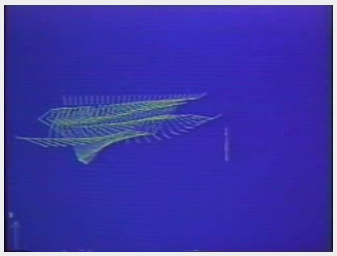
The center's research has led to the production of comfortable, efficient shoes. The design process starts with observing people walking, running, jogging, and standing, and understanding these activities from a biomechanical perspective. The resulting shoe design balances shock absorption and efficiency, based on the biomechanical data and electromyogram data.

Model Id: gpt-4-0613
Created on: 2023-09-19 00:13:32
Processing time: 00:00:21.1980000
Total tokens: 1264

Audio transcription

Frame	#	Time	Spoken text
	0.	00:00:00	*The Coto Research Center, located in Trebucco Canyon, California, is home for one of this*
	1.	00:00:14	*country's leading experts in the quickly emerging field of biomechanics, Dr. Gideon*
	2.	00:00:19	*Ariel.*
	3.	00:00:22	*Here, surrounded by his arsenal of computer hardware and software, Dr. Ariel and his staff*
	4.	00:00:27	*worked to gain a better understanding of human locomotion and the factors that influence*
	5.	00:00:32	*and effect movement.*
	6.	00:00:35	*The process starts with a combination of high-speed photography and sensor measurements of muscle*
	7.	00:00:41	*activity.*

Frame	#	Time	Spoken text
	8.	00:00:43	*Sensor measurements are achieved with the use of two specialized pieces of equipment,*
	9.	00:00:47	*the electromyograph, or EMG, and the kissler force platform.*
	10.	00:00:54	*Templates are placed on the muscles to be measured and through radio signals data is*
	11.	00:00:58	*sent to the computers where calculations can be easily performed.*
	12.	00:01:04	*In the same manner, the force platform is used to measure how different forces come into*
	13.	00:01:09	*play as each step or stride is taken.*
	14.	00:01:13	*These measurements include the amount of torque and the vertical horizontal and lateral pressures*
	15.	00:01:19	*placed on each muscle as the movement progresses.*
	16.	00:01:22	*Why is this important for a better shoe design?*
	17.	00:01:26	*Dr. Ariel explains.*
	18.	00:01:28	*When we want to optimize athletic performance or we want to optimize other athletic equipment*
	19.	00:01:35	*or a shoe, we have to rely on science rather than on the guests because human eye is very*
	20.	00:01:44	*inefficient in trying to see the forces.*
	21.	00:01:47	*We have to measure the forces.*
	22.	00:01:49	*The field that allows us to measure the forces in biological systems is the field of biomechanics.*
	23.	00:01:55	*Using a high technology and computer system, it allows us to take a high-speed cinematography,*
	24.	00:02:02	*measuring the material, measuring the duration of the step, and that allows us to design*
	25.	00:02:09	*and optimal shoes.*
	26.	00:02:10	*We want to know, for example, how much of absorption we want in the shoe.*
	27.	00:02:15	*We would like to know how much the shoe should bend, actually, when you walk in it.*
	28.	00:02:19	*We would like to know how much energy is lost and how much energy is recovered.*
	29.	00:02:23	*All these factors are extremely important in designing a comfortable shoe.*
	30.	00:02:29	*We rely on a high-speed cinematography where we're taking a high-speed firm to rely on*
	31.	00:02:33	*force platform where it measures all the forces when the person strikes the ground.*
	32.	00:02:38	*We're measuring different surfaces as to how they interact with the different shoes and*
	33.	00:02:43	*putting all these characteristics into our computer technology allows to design the*
	34.	00:02:50	*optimal shoe for the person.*
	35.	00:02:52	*Instead of putting a shoe in a person, we're putting a person in the shoe, and this is*
	36.	00:02:57	*the most important factor in optimizing shoe design.*
	37.	00:03:03	*Once all the data is recorded, the computers are used to calculate and analyze the information.*
	38.	00:03:09	*Each frame taken of the subject is used to trace the body's movement.*
	39.	00:03:14	*Using a digitizing pin, Dr. Ariel inputs the position of each joint.*

Frame	#	Time	Spoken text
	40.	**00:03:21**	*From these points, the computer generates stick figures that duplicate the actual movement.*
	41.	**00:03:27**	*This is an important point because a large part of the reason biomechanics is so successful*
	42.	**00:03:31**	*at improving performance, reducing injury, and designing better products, is the fact*
	43.	**00:03:37**	*that it analyzes real movement, not simulations.*
	44.	**00:03:43**	*These stick figures can be manipulated to provide a clear picture of how each body part moves*
	45.	**00:03:47**	*in terms of speed, acceleration, and energy output.*
	46.	**00:03:54**	*For Lowell, all of this has come together in the production of a truly comfortable, efficient*
	47.	**00:03:59**	*shoe.*
	48.	**00:04:00**	*In order to optimize the best shoes, we have to start with people walking, running, jogging,*
	49.	**00:04:08**	*standing, and find what are the characteristics of these activities from the biomechanical*
	50.	**00:04:12**	*point of view.*
	51.	**00:04:14**	*When we learn about that, we start designing shoes with proper characteristics.*
	52.	**00:04:20**	*What characteristics are, the proper shock absorption, the counter of the sole, the comfort*
	53.	**00:04:27**	*characteristics of the shoes.*
	54.	**00:04:29**	*What shape the sole should have?*
	55.	**00:04:31**	*For example, we found out that you need a concave sole so you will have like a trampoline*
	56.	**00:04:37**	*effect.*
	57.	**00:04:38**	*Also, we want to know how much shock absorption a person wanted in the shoe.*
	58.	**00:04:42**	*We don't want too much shock absorption because, you know, walking on sand, which has very*
	59.	**00:04:46**	*good shock absorption, it's not very comfortable after you walk a mile.*
	60.	**00:04:50**	*Also going on a hard surface might be very efficient, but after a mile you will feel*
	61.	**00:04:54**	*your feet.*
	62.	**00:04:55**	*So we needed to compromise between a very efficient shoe that don't absorb any shock*
	63.	**00:05:03**	*and between a shoe that absorbs too much shock.*
	64.	**00:05:06**	*And we came with a proper design, with the proper sole and the counters of the sole, with*
	65.	**00:05:12**	*the proper comfort characteristics to design the optimized shoes relying on the biomechanical*
	66.	**00:05:18**	*data, on the electromyogram data, on all the characteristics of walking that require.*
	67.	**00:05:25**	*By integrating all these characteristics we came with the most optimized shoes available*
	68.	**00:05:30**	*today.*

This PDF-document has been auto-generated from a video file by arielweb-ai-bot v1.2.2023.0926 on 2023-09-28 03:46:58 without human intervention. In case of errors or omissions please contact our aibot directly at ai@macrosport.com.

Video filename: **adi-vid-01018-lowell-shoes-256kbps.mp4**

Disclaimer of Liability

While every effort has been made to ensure the accuracy of the information presented on this website/document, Ariel Dynamics Inc. makes no warranties or representations regarding the completeness, accuracy, or suitability of the information. The content is provided "as is" and without warranty of any kind, either expressed or implied. Ariel Dynamics Inc. shall not be liable for any errors or omissions in the content or for any actions taken in reliance thereon. Ariel Dynamics Inc. disclaims all responsibility for any loss, injury, claim, liability, or damage of any kind resulting from, arising out of, or in any way related to the use or reliance on the content provided herein.