Issues of Human Interface design

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Berke
PROSTHETICS & ORTHOTICS

Disclosures

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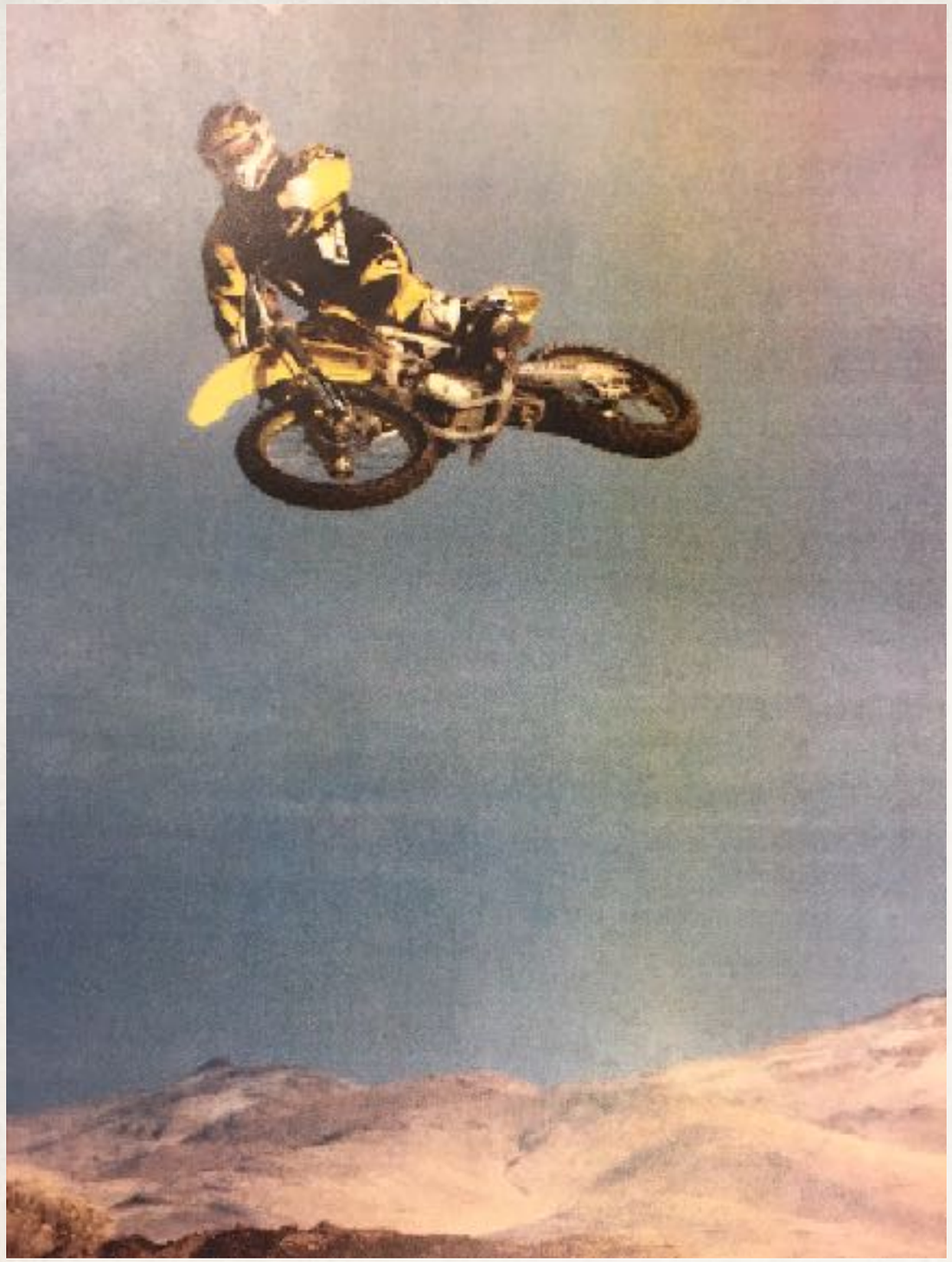
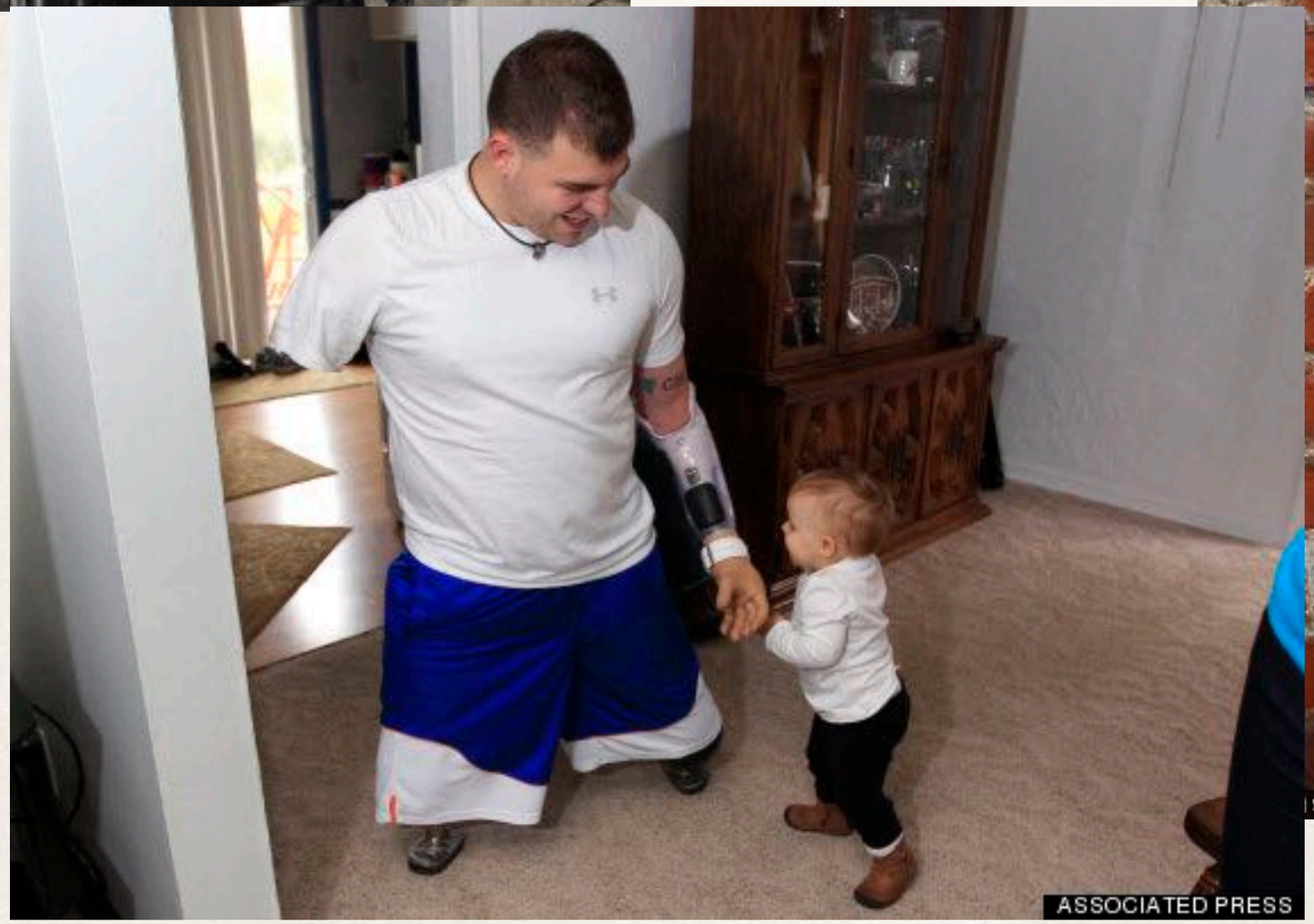


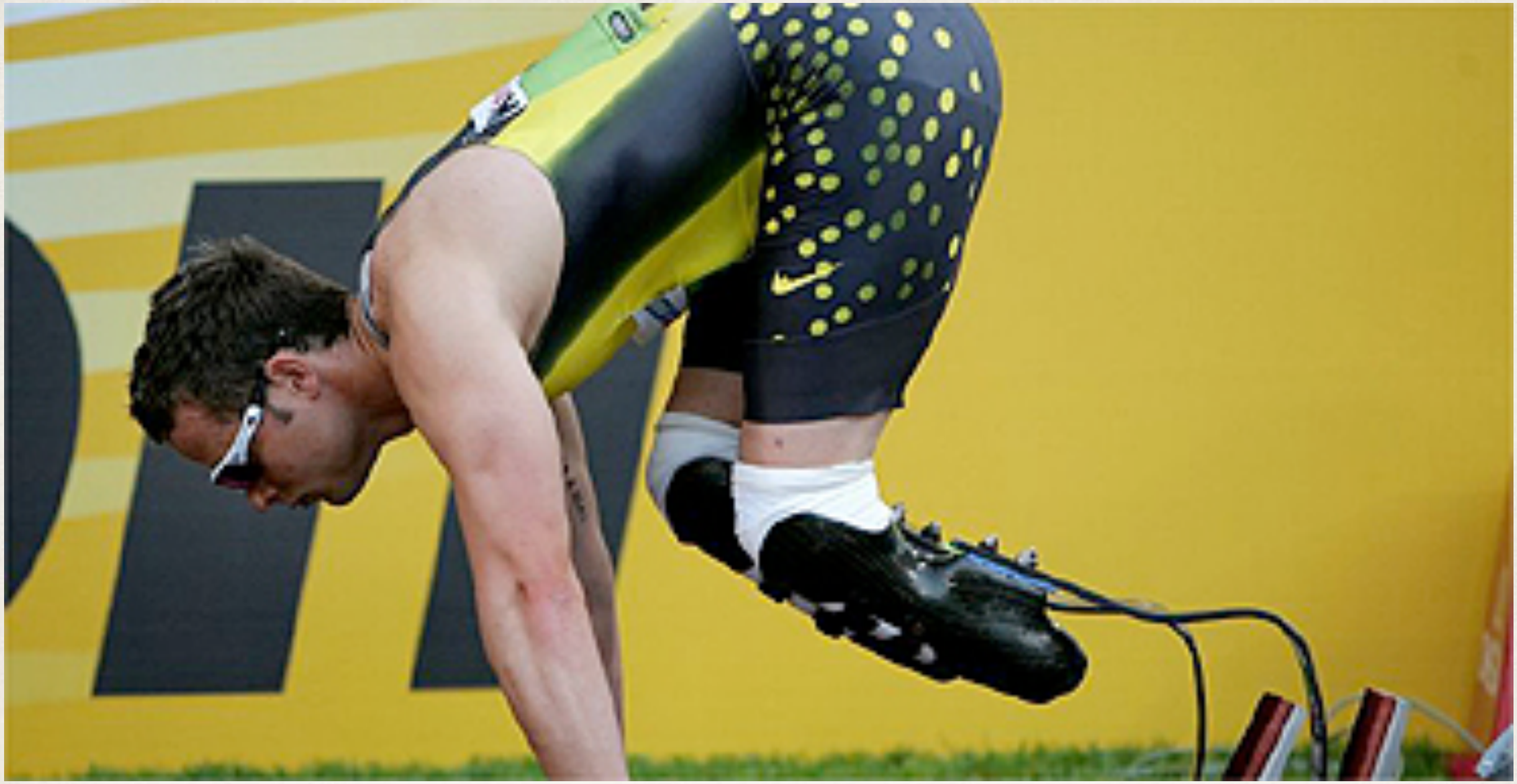

GARY M. BERKE
PROSTHETICS


EOD


ASSOCIATED PRESS

SECTION ONE

The older I get the less I know.



Better than human?

How do you design a shoe?

Five C's

- Comfort
- Cosmesis
- funCtion
- Cost
- Cool

Better than Human?


Knee cuffs
Advanced Binding
A-frame
Spring feet
Replaceable Foot pads


niko

Comfort

- Transference of pressure
- No “noxious” stimuli (noise, vibration etc)
- Heat
- Nuisance factor
  - easy to put on and take off
  - not too bulky
- Weight
- Sensitivity of skin or nerve

Comfort

- What makes something UN-comfortable?

Comfort is illusive

- What may be “comfortable” one minute may not be the next…..

FUNCTION

- Is it a device that reliably does what it is intended to do?

FUNCTION

- Is there a device that can do everything?


FIRE
DEPARTMENT

Cosmesis

What is cosmetic?

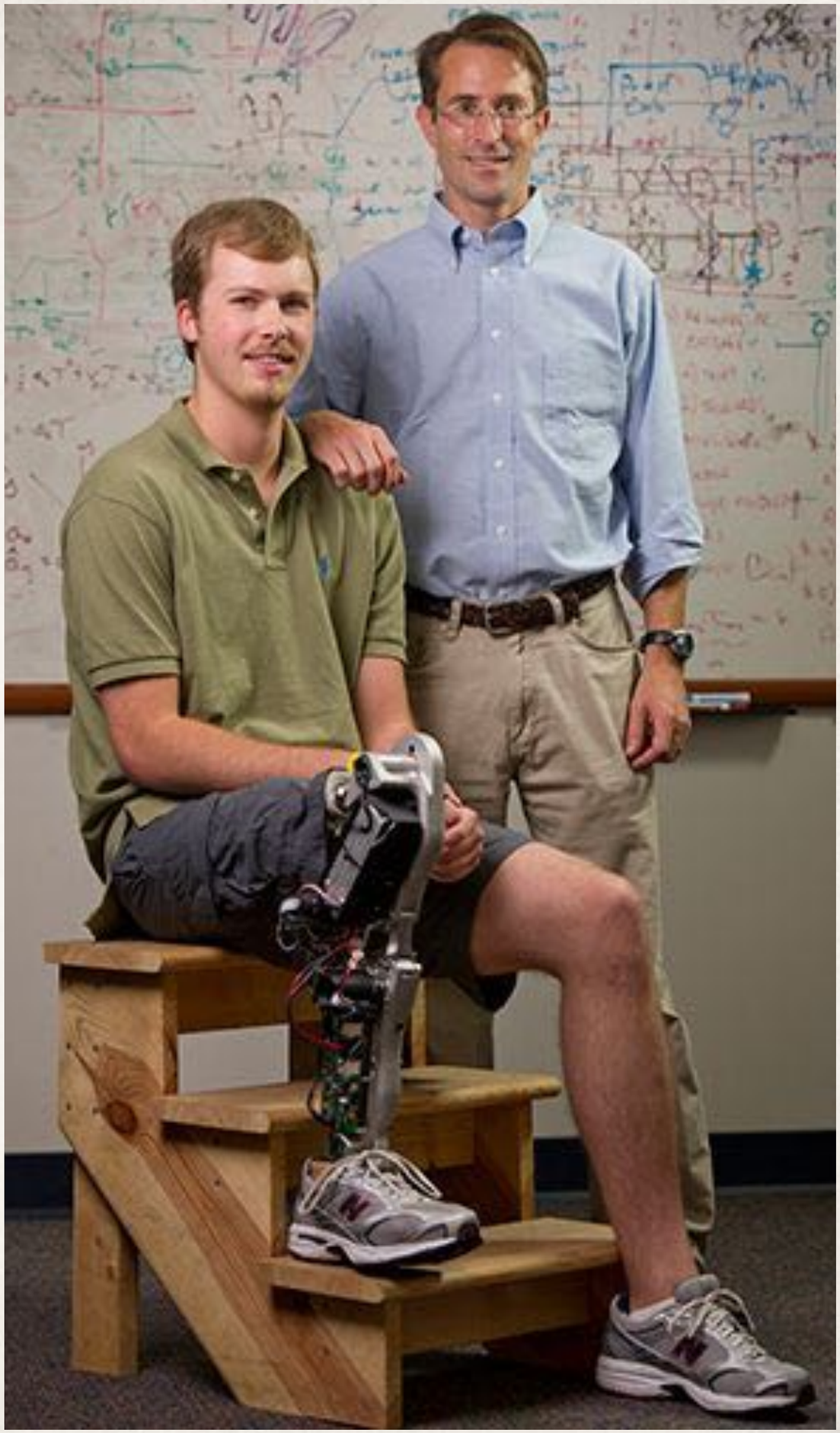
Cosmesis

- How do we perceive ourselves?
- How do changes to our body affect our perception of cosmesis?

Cost

- What is it worth to the consumer and…

- If it costs way more, does it provide a proportional improvement in comfort, function, cosmesis or cool?



BIONIC

COOL

How do “things” interact with humans?

glasses

	Regular glasses	Self Adjusting
Comfort	√	
Function	√	√
Cosmesis	√	
Cost	√	
Cool		√

SECTION TWO

- There are people everywhere that use sticks to eat, perhaps we should 3-D print them forks.

SECTION TWO

- Just because we CAN, doesn't mean we SHOULD


LANCERS

the celebrated Artificial Limbs, with India Rubber Hands and Feet.

PATENT

A. A. MARKS,

MANUFACTURER OF

ARTIFICIAL LIMBS

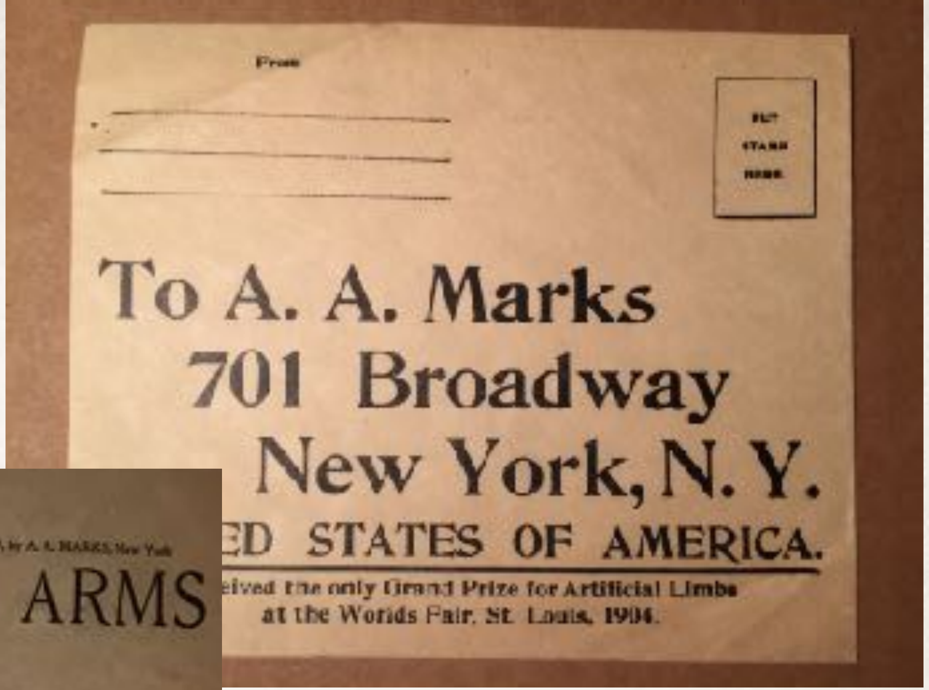
575. BROADWAY,

NEW YORK

OPPOSITE THE METROPOLITAN HOTEL

States Army, to furnish Soldiers with Artificial Limbs, FREE OF CHARGE.

First Premium (GOLD MEDAL,) awarded by the American Institute, 1865, as the BEST.



ORDER SHEET FOR ARTIFICIAL LEGS AND ARMS

TO BE FILLED ACCORDING TO DIRECTIONS AND THEN FORWARDED TO

A. A. Marks, 701 Broadway, New York, U. S. A.

Section I. Directions for Taking Measurements and Diagrams of Single Leg Amputations (Right or Left)

ONE LEG AMPUTATED IN OR ABOVE THE KNEE

ONE LEG AMPUTATED BELOW THE KNEE, OR FOOT AMPUTATED AT THE ANKLE, OR INSTEP

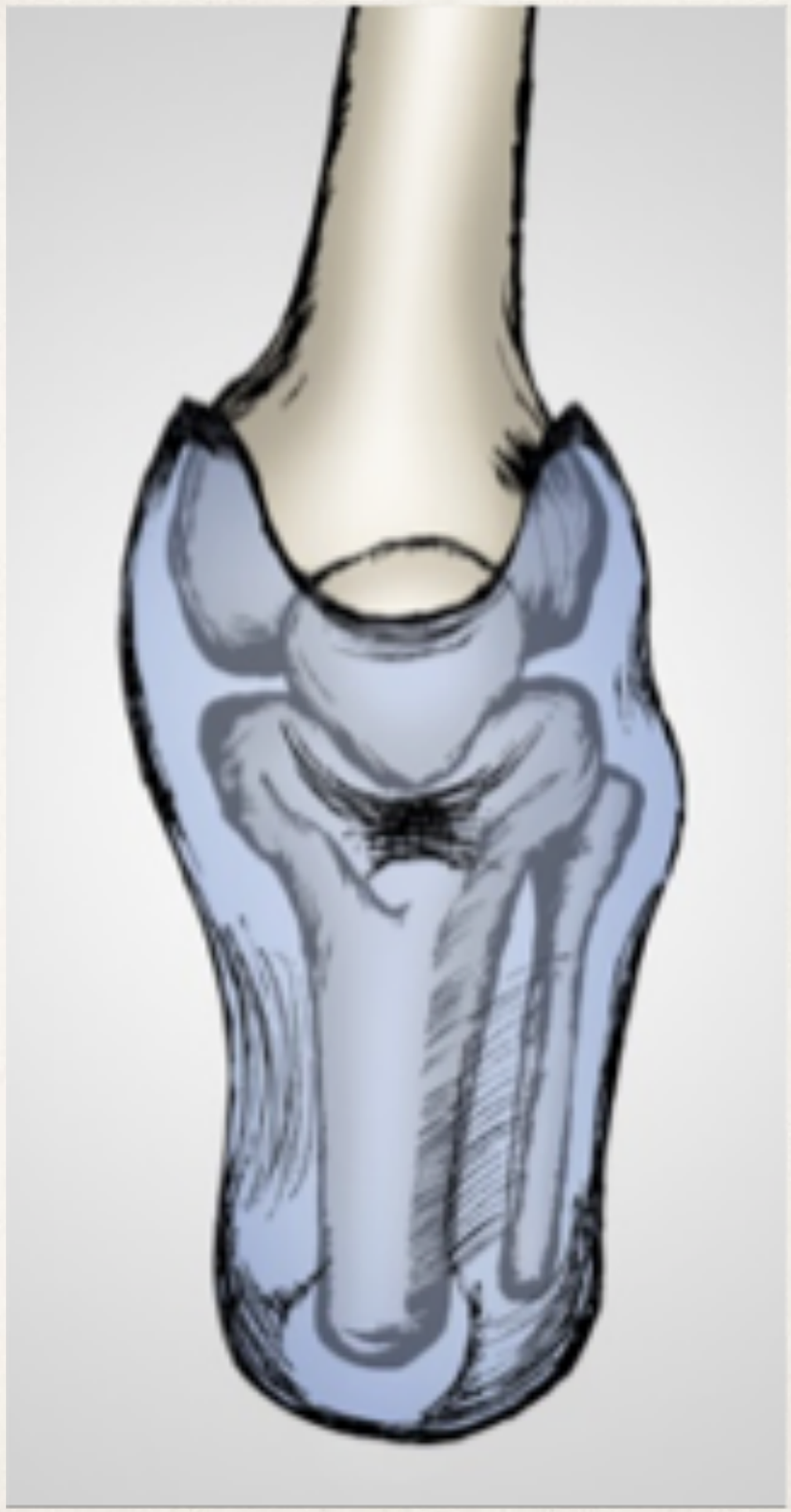
ONE LEG AMPUTATED BELOW THE KNEE, LEAVING A VERY SHORT OR CONTRACTED STUMP, REQUIRING THE USE OF A KNEE-BEARING LEG

Section II. Illustrations Showing the Manner of Measuring

Section III. Directions for Taking Diagrams and Profiles of Single Leg Amputations


CABINET
PORTRAIT
PHOTOGRAPHED BY
OTTAWA

Total Contact/ Total Surface Bearing

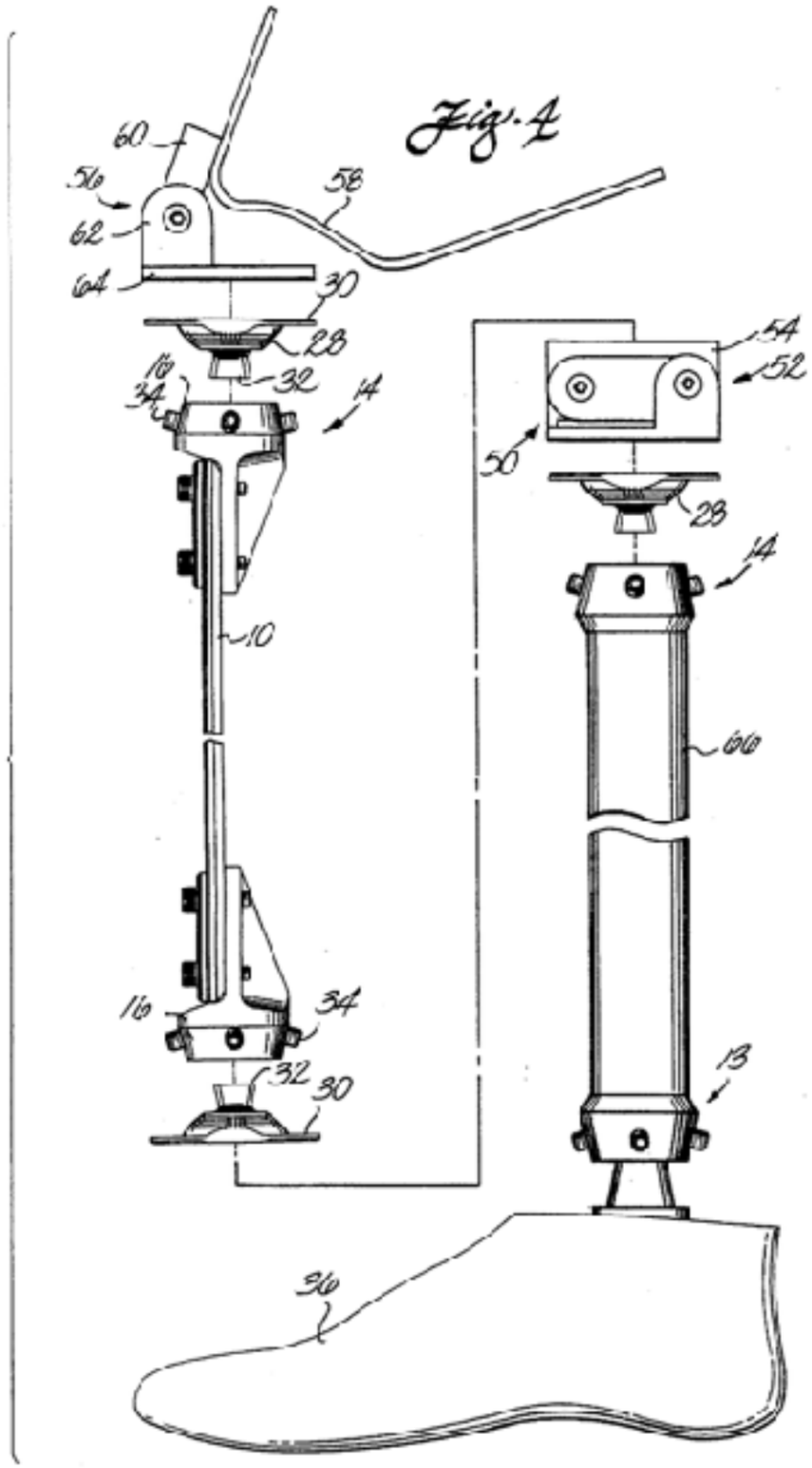


Exo

Alignment adjustability

Exoskeleton vs Endo

80’s-90’s



SECTION THREE

- What ya can't see on the X-ray is that she is a flaming schizophrenic.


A prosthesis must fit intimately enough to comfortably support the limb during high loading, not bother the soft tissues and bone and transfer motion from the human to the device with extreme efficiency.
ÖSSUR


R

Total Contact/ Total Surface Bearing

PREDICTING CHANGE!


www.vendalimb.com
Adult leg: £99.99
Child leg: £59.99
Fitting service available
see
www.vendalimb.com
for details
NHS Vouchers and Credit
Cards Only
Service -

SECTION FOUR

- It is hard when the expectation of the patient is greater than the design can provide.

DIPO
POWER
CYBATHLON 2016
35
RADOCY
DIPO Power
ETH zürich
sche

Find a problem that needs to be solved!

HUMAN?

Prosthetics is about Health Care

- It is a process -not an event and the "device" is a result of a careful examination/ evaluation and fitting

- It is a process of virtually continuous change

The perfect device is one that balances all of the above for that individual

Exo Technology solves back pain

$4500.00

Date

	Exo Back Brace
Comfort	
Function	+/-
Cosmesis	
Cost	
Cool	√

Two pathways to prosthesis provision

- Vend a prosthesis
- provide prosthetic care.

Research showed 30 years ago that traction had no real effect on DDD because the discs don't rehydrate and the resulting facet arthritis is probably the cause of the pain. Mechanical back pain responds well to therapy and postural training, not to mention weight loss, and orthoses have minimal effect. (Rogers)

30% of people will feel significantly better just by being given the brace

Date

Why are we hell-bent on making people with amputations better than human when we're not making able-bodied humans better than human?

Lets play a Game

Adidas' latest 3D-printed running shoe will cost you $333

Comfort

Weight

Noise

Pain

Pressure

Snugness / Looseness

Garbage in

Making a Better Sport Shoe.

- Garbage in
- Make a device to get the garbage in (time / energy)
- Scan
- Print

Case studies

Wounds

Interosseal Neuroma

scar tissue

H.O.

pain

How do we make prostheses now

- Garbage-in
  - Scan
  - Cast

Costs:

- Cost benefit analysis

Cost

People don’t like to wear stuff.. that doesn’t help them.

- Glasses, shoes, sweaters, hats, braces, gloves and PROSTHESES

	Body Power	Myoelectric
Comfort	√	
Function	√	
Cosmesis		√
Cost	√	
Cool		√

We have a problem with technology

- We always want something new, often without formal training and WITHOUT QUANTIFIABLE BENEFIT and on some occasions, causing harm.

Liner

Thick inner boot for comfort & protection of the foot and ankle. Machine washable

Size Marks

Easy Buckles

Quick release buckles and sturdy straps allow fast, easy on & off.

Outer Boot

Made of polyurethane material that won't crack or break.

Hinge Feature

Allows ankle to move freely.

IPS *Support Plate*

Improves comfort, stability and increases the rebound effect.

IPS *Shells*

Spring arcs made of "Space Age" plastic material. (Upper and lower shells are the same)

4 TwinTurbos

Patented Rebound boosters

IPS *T-Spring*

Adjustable / Interchangeable Tension Bands to fit your weight or usage.

Non-Slip Tread

Rugged sole for all surfaces, indoors and out.

Assembled with **4 clamps**


OREO
Fig Newto
Nutter Butter
Nilla