

We could all “Stand to Lose” An Ergonomics Perspective on Office Obesity...



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Personal Journey



- **Training and Background**
- **Ergonomic History**
- **Research Areas**
 - Obesity Prevention in Offices and Schools
 - Patient Handling vehicle
 - Medical Devices (infusion pumps, EKG printers)
 - Rehab Engineering (wireless retainer)
 - Human Factors (cell phones, automobile safety)
 - Furniture (office, classroom, boardroom)
 - NASA (Energy from Space)

Major Influences on the Health Outcomes of the Future Office Worker



- **Technological Advances**
- **Generational Shifts and Trends in Workers**
 - “screen time, contact management, margin
- **The Environment**
 - Regulations, necessity
- **Diversity**
- **Size and Shape (Obesity) of Workers**
 - Calories or activity – what has changed?

Current Stressors on Office Worker Health



- **Age**
- **Gender**
- **Related Disease**
- **Force/Freq/Duration/Posture**
- **Psychosocial issues**
- **Technology induced inactivity**
- **Obesity**

What could the office of the future include?



- **Computers that know you?**
- **Nanotechnology?**
- **Passive Biometrics for all types of access?**
retinal scans, finger prints, facial recognition, voice activation,
(type/written passwords are history)
- **Smart furniture that adjusts to your needs just by walking into the room?**
- **What about 10 GHz, non-silicon based computers, holograms or heads-up displays?**
- **Programmable office subs for important VR meetings where an impression needs to be made.**

The Future Office



- All-encompassing computer
 - eliminates brief case, printer, projector, cell phone, pagers, GPS, wrist watch, calendar/planner, video recorder, audio recorder (captures meetings) MP3 player and camera
 - ✦ Will it be worn or implanted?
 - ✦ Universal, worldwide – wireless connection.

The Future Office



- **IPv6 – the new internet protocol that will allow device to device communication without the use of a server.**
 - You Tube concerns
- **2049 – Computer consciousness arrives**
 - One PC will mimic ALL HUMAN MINDS in History and will work together simultaneously with connectivity and full recall from a totally wireless, worldwide, neural network
 - 3 trillion vs 1 trillion (calculations/second)

IF Technological change and upgrades by 2020 are a given, what are the health impacts TODAY?

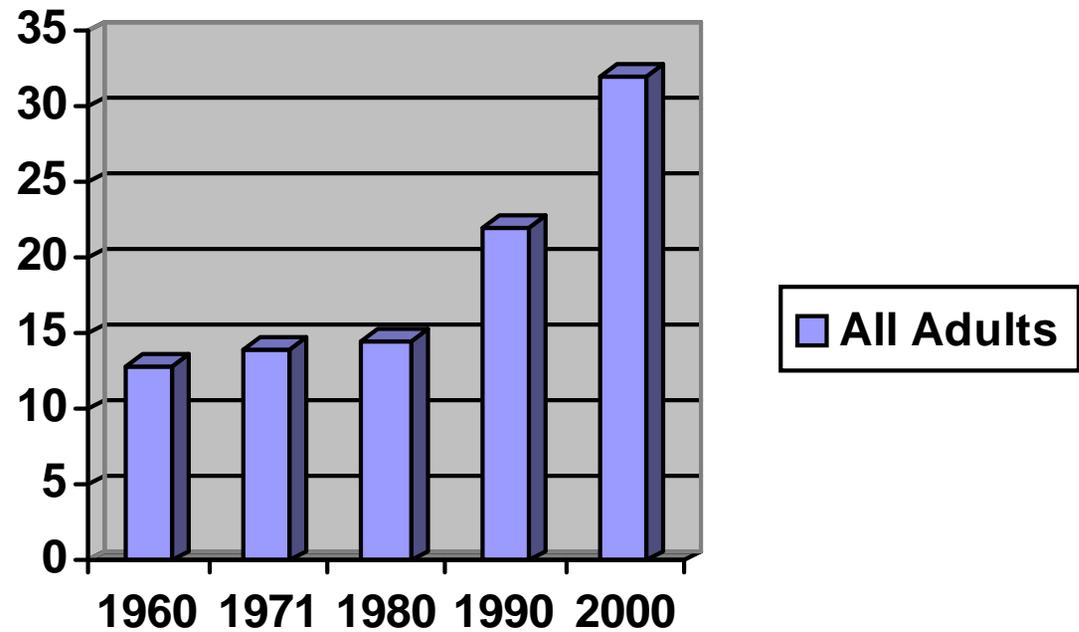


- In 2006, 66% of Americans were overweight or obese.
 - ✦ *Did the obesity rate in America come from working in sedentary, seated jobs?*

Recent Obesity Trends



- % of “overweight” Adults in the US



US Adult Weight Change



	<u>1960</u>	<u>2004</u>	<u>Change</u>
Average Male Weight	166 lbs	190 lbs	↑ 14%
95 th tile Male Weight	213 lbs	255 lbs	↑ 20%
Average Female Weight	139 lbs	164 lbs	↑ 20%
95 th tile Female Weight	189 lbs	255 lbs	↑ 34%

How does obesity impact the USA today?



Due to the obesity pandemic, the CDC is predicting that the children of today are predicted to be the **FIRST** generation of Americans in modern times to have a shorter life expectancy than their parents.

In 2006, Obesity became the **#2** killer of Americans with 400,000 deaths. It was second only to Smoking at 450,000 deaths.

Half of the obesity related deaths were from Diabetes.
Diabetes costs in the US in 2007 were over \$174 Billion.

What about Normal Weight Employees?



Normal Weight Employees – Are they the NEW Minority?

<u>YEAR</u>	<u>Percentage of Workforce in NORMAL BMI Range</u>
1987	52%
2001	39%
2010	17%

(Thorpe. K. et al Health Affairs Web Exclusive W4-480; 10-20-04)

Are US Corporations Experiencing the Costs of Obesity?



- **\$13 Billion** was spent by employers in 2006 on direct compensation for obesity related medical expenses.
- Obese workers file twice the number of worker's compensation claims and have 7 times higher medical costs from those claims.

Corporate Experience



- ◆ Severely obese workers are more likely than normal weight workers to suffer more hand, wrist and finger injuries.
- ◆ The obese worker will lose 13 times more days of work from work injury or illness than a non-obese workers.

Corporate Experience



- 1. Obesity directly contributes to 36 percent of excess productivity loss inside corporations due to unscheduled absences, disability, and “presenteeism”**
- 2. More than half of the growth in healthcare spending was attributable to increased prevalence of disease rather than an increase in how much it cost to treat each person.**

Adverse Health Outcomes



<u>Life Event</u>	<u>Increased Risk of Chronic Disease</u>
Past Smoker	7%
Heavy Drinker	13%
Current Smoker	27%
Living in Poverty	58%
Aging from 30-50	70%
Obese (BMI > 30)	67%

(Sturm & Wells, Rand Corporation, The Health Risks of Obesity 2005)

What do workers with obesity and decreasing quality of health attempt to do?



- **Each year, we spend \$54 Billion on exercise and dieting due to marketing magic and System Thinking**
 - Less than 1% of us are successful with these methods 5 years after losing the weight.
 - Viagra vs. heart medications (another paradigm broken)
- **Bottom line – Caloric Intake continues to go up while Caloric Burn continues to go down.**

What are Corporations doing about it?



Providing Weight Loss Classes, Gyms, diet information etc.

Cash incentives per pound of weight loss

Cash penalties on premiums per pound over limits

Not hiring, high risk workers including smokers and now the obese

What About Health & Safety Experts within Corporations?



- **Measure the rates...**
 - Few are addressing the underlying issues or related disease and costs of obesity.
 - Even fewer are taking leadership roles and offering solutions for employees and employers.
- **Bottom Line:**

We need research funding for prevention that matches the prevalence and related costs of obesity and its related disease.

Let's Start NOW and DO what we CAN!

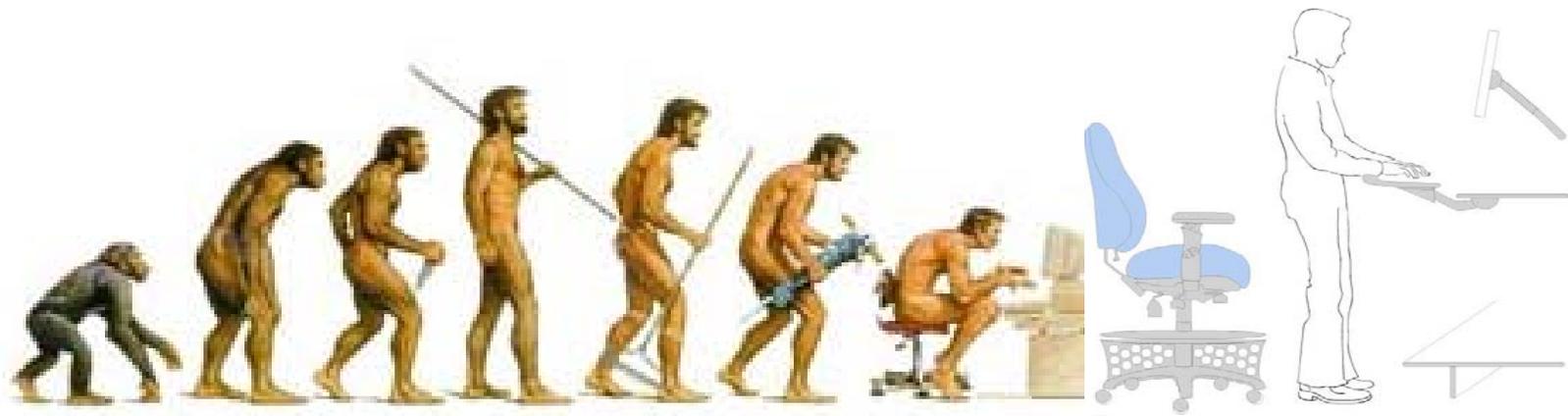


- **Integrated stand/sit furniture designed for the office**
- **Not a seated station with standing capability but a standing station with seated options...**
- **A workstation DESIGNED for computer users, not modified for computer user**
- **Ergo benefits include increased blood flow, better respiration and alertness, improved communication and employee interaction**
 - ✦ **Less maintenance and repair**
 - **Move the part or move the person?**
 - ✦ **Increased productivity**
 - ✦ **Better Collaboration**
- **Increased calorie burn to fight weight gain,**
 - **40% higher calorie burn while standing compared to sitting**
 - **This could equal 20lbs in one year if you stand for 2-3 hours per day.**

The Stand/Sit Stations of the Future



- ✦ Significant cost reduction over traditional adjustable stations
- ✦ No power requirements to operate, designed for Wireless!
- ✦ Design depths for Flat Panel Monitor and built in CPU
- ✦ Less maintenance and repair
 - Move the part or move the person?
- ✦ Increased productivity
- ✦ Better Collaboration

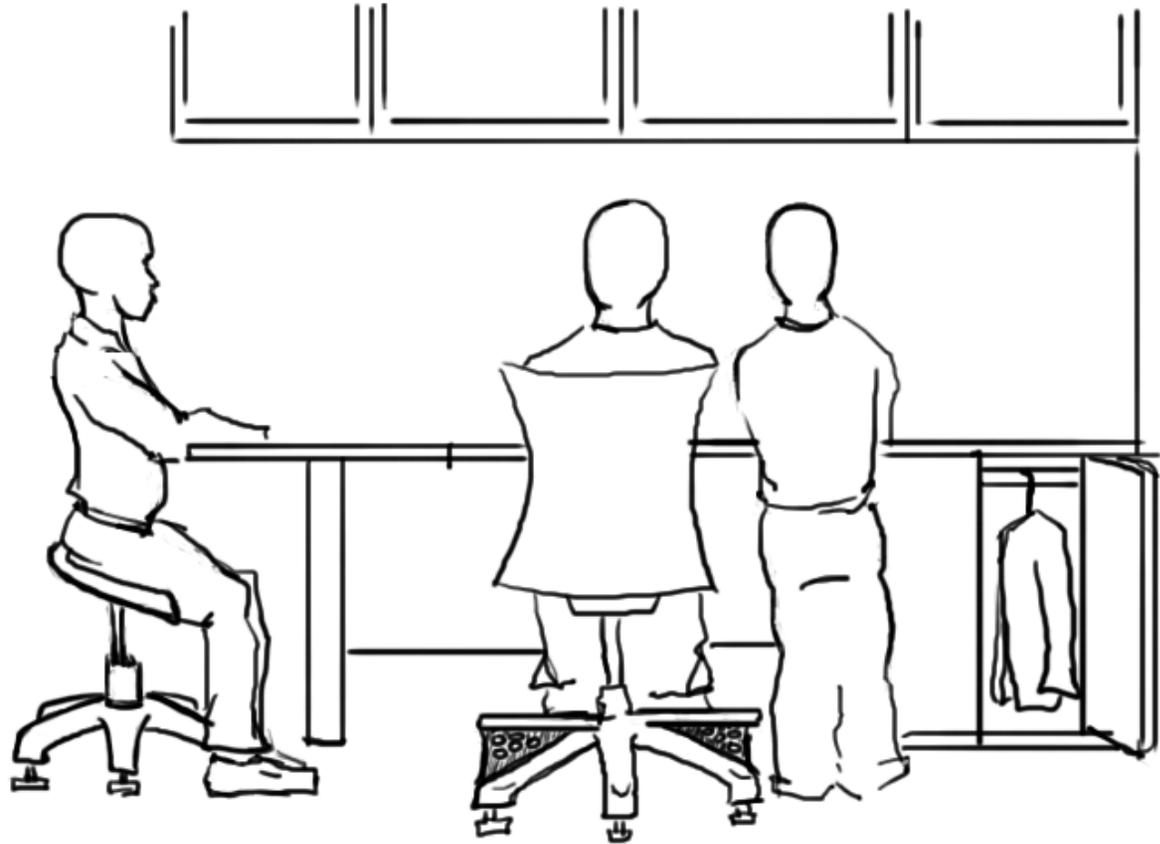


The Evolution of Homo Office Humankinderus

What Could it look like?



Ergo issues?



What does it look like in practice?



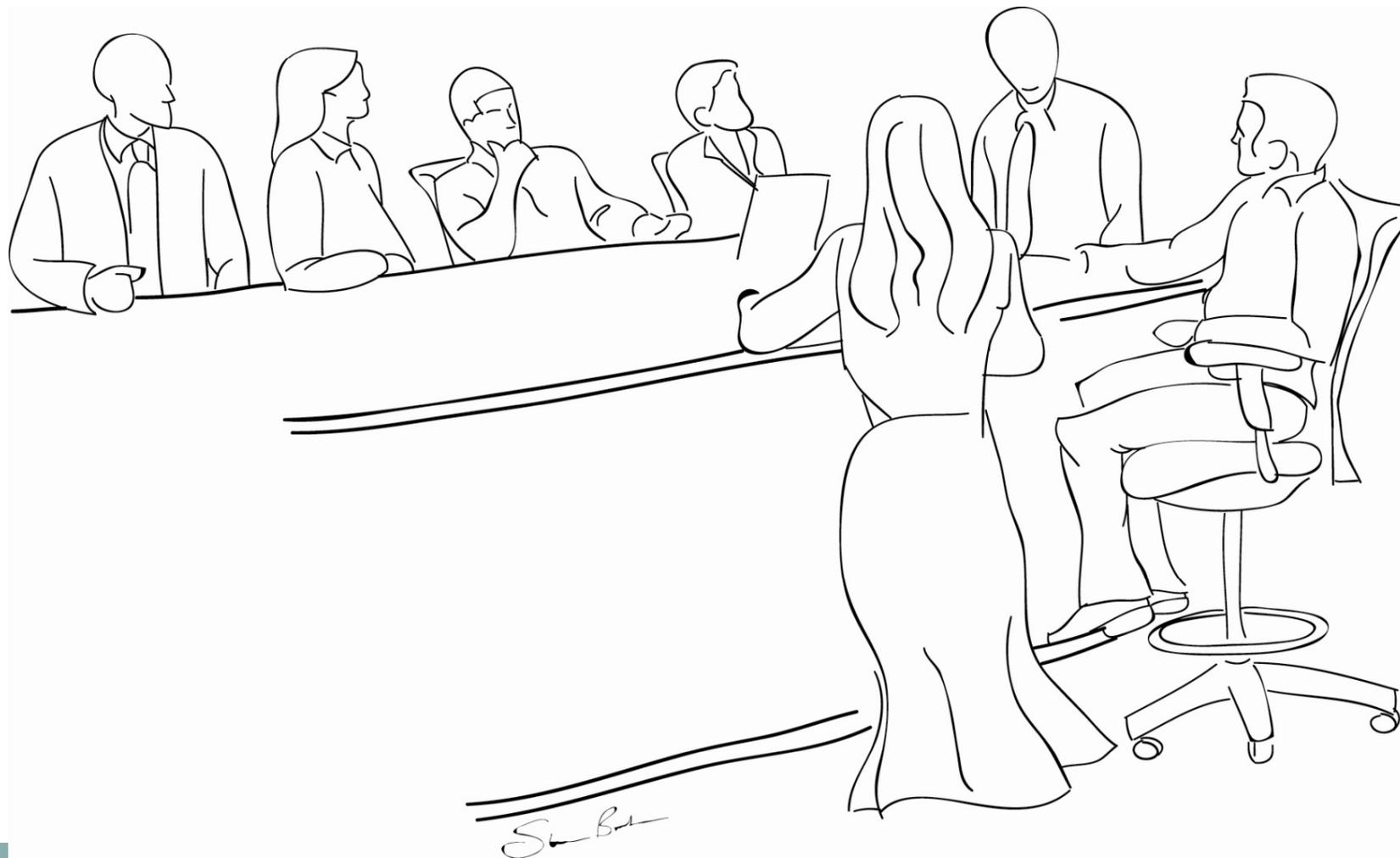
Commercial Post
and Beam
Systems
Furniture

Does that mean we all have to replace our desks?



Home Grown Solution: PVC Pipe and Blocks Modifications

Stand/Sit Conference Room



Stand/Sit Conference Room



Stand-Sit for the Classroom

- Adjustable Height
- Sit or Stand



Adjustable desks go 28"-36" for k-5th grade and 34"-42" for 6th-12th. Corresponding chair seat height would be 20"-34" depending on the grade.

Pilot Research Study Information



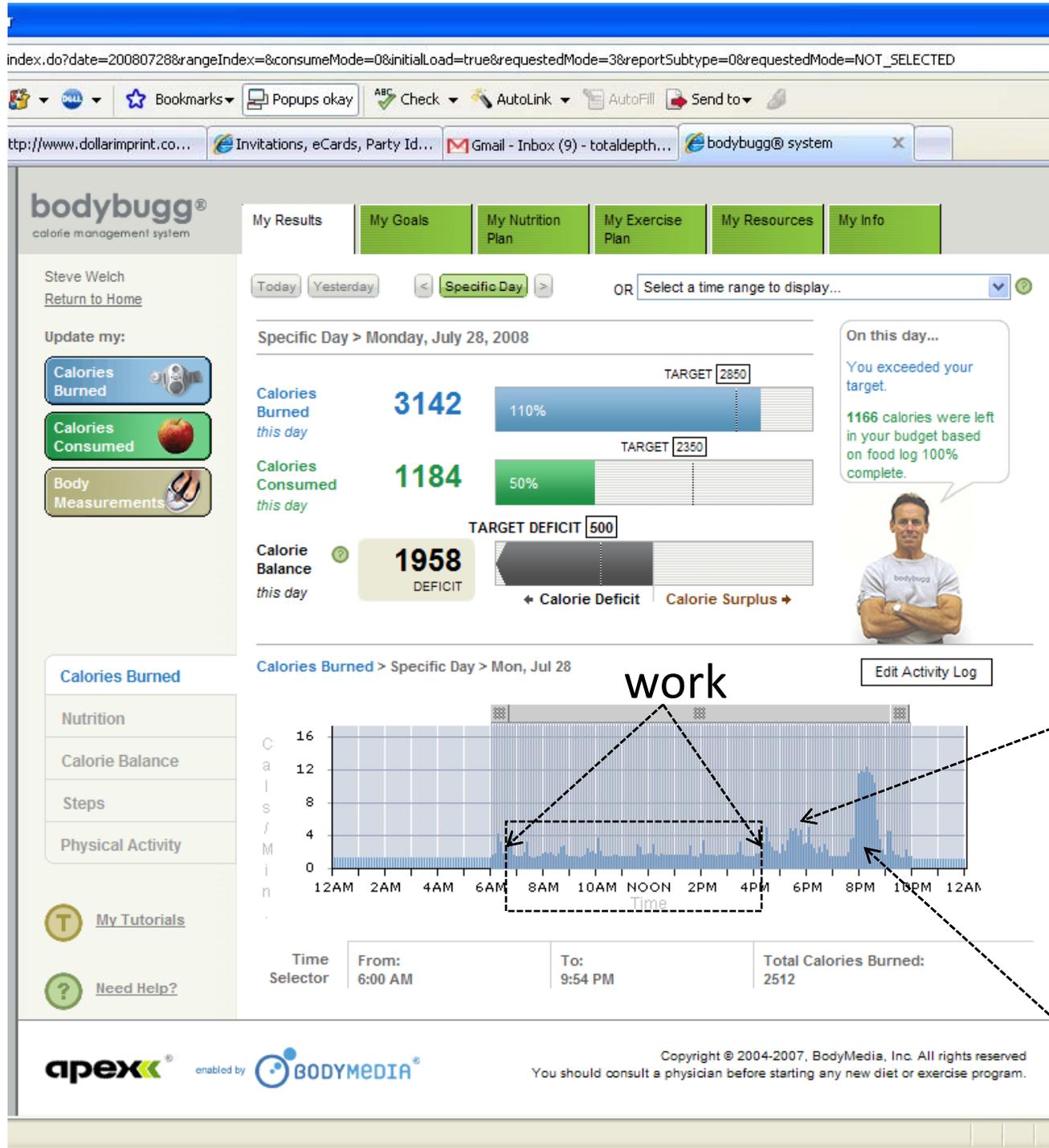
- **Pilot Study**
 - Small field trials to test equipment variability
 - Data collection reliability established
 - Timelines for collection established
- **Pilot Study Classrooms**
 - Multiple treatments of elementary school classrooms
 - Evaluation of caloric burn, BMI pre/post, academic measures, Recalibrate devices for children
 - Evaluation of behavior, collaboration, alertness

Field Studies



Pilot Studies have shown that we:

- *1. Have a significant and relevant differences.*
- **Field Study in Offices**
 - Large, US based cohort that can be tracked over several years,
 - **Need US Corporate support for statistical power and cost sharing**
 - Much easier to track and control over time
- **Field Study in Classrooms**
 - Need multiple cohorts tracked over many years
 - Prefer small groups of isolated students (Texas, Indiana, California)
 - MANY bias concerns with growth, dynamic environments etc.



Data Example:

index.do?date=20080731&rangeIndex=&consumeMode=0&initialLoad=true&requestedMode=3&reportSubtype=0&requestedMode=NOT_SELECTED

Browser toolbar with icons for Home, Back, Forward, Stop, Refresh, Print, and Search. Address bar shows: <http://www.dollarinprint.co...> Tab: [bodybugg@ system](#)

bodybugg®
calorie management system

- My Results
- My Goals
- My Nutrition Plan
- My Exercise Plan
- My Resources
- My Info

Steve Welch
[Return to Home](#)

Update my:

- Calories Burned
- Calories Consumed
- Body Measurements

Today Yesterday < Specific Day > OR Select a time range to display...

Specific Day > Thursday, July 31, 2008



On this day...
214 calories were left to burn.
1307 calories were left in your budget based on food log 100% complete.

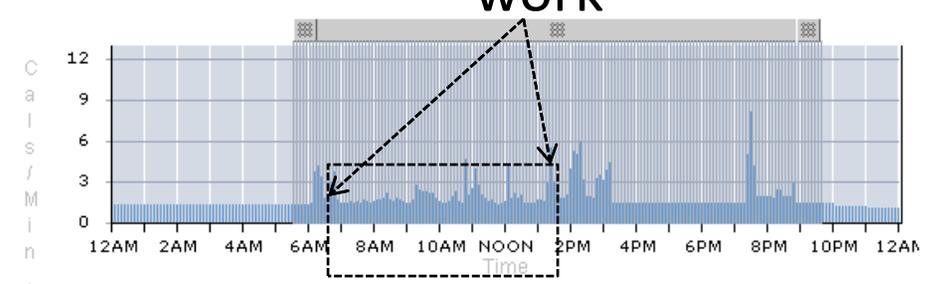


- 4 Sampling Modes
- GSR
- Skin Temp
- Heat Flux
- Accelerometer

- Calories Burned
- Nutrition
- Calorie Balance
- Steps
- Physical Activity

- My Tutorials
- Need Help?

Calories Burned > Specific Day > Thu, Jul 31 [Edit Activity Log](#)



Time Selector	From: 5:30 AM	To: 9:30 PM	Total Calories Burned: 2009
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