

Honors 177

MIDTERM

Title:

Teeth Journal : The Ultimate Solution to Eating Healthy

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Major: Psychobiology

ABSTRACT

Through the electronic gadget attached to the user's teeth, anything that the person eats will be analyzed by the gadget and recorded on a computerized program which will help the person visualize the content of his or her food consumption each day. The goal of the project is to help one achieve or maintain a healthy weight by allowing accurate measurements of one's caloric intake, serving as a food journal. Not only would this device help keep track of calories, but it would also be able to give information about breakdown of main food groups. By knowing how much and what we eat, the Teeth Journal will not only help us realize what we need more or less in our diets but also, it could be a solution to the major problem of obesity.

CONCEPT / TOPIC

My project's conceptual focus is on a revolutionary diet program based on advanced biotechnical tools and computerized systems. I am interested in how these modern tools can help us achieve the aesthetic value we have for our bodies by maintaining a healthy weight. This project also aims to raise public awareness of nutritional value in the types of foods we consume on a daily basis in order to solve the epidemic of obesity in US. The term obesity is defined by the person's Body Mass Index (BMI) which compares his or her weight and height. A person whose BMI is greater than 30 is called obese and it is a source for many diseases including heart diseases and type II diabetes.³ One of primary treatment for obesity is managing dietary calories, which is the main target of this project.

CONTEXT & PRECEDENTS



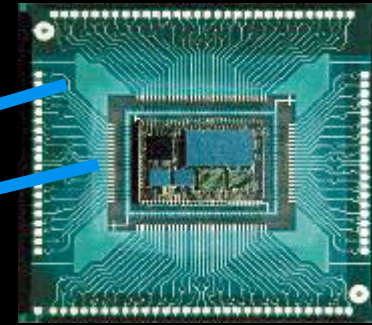
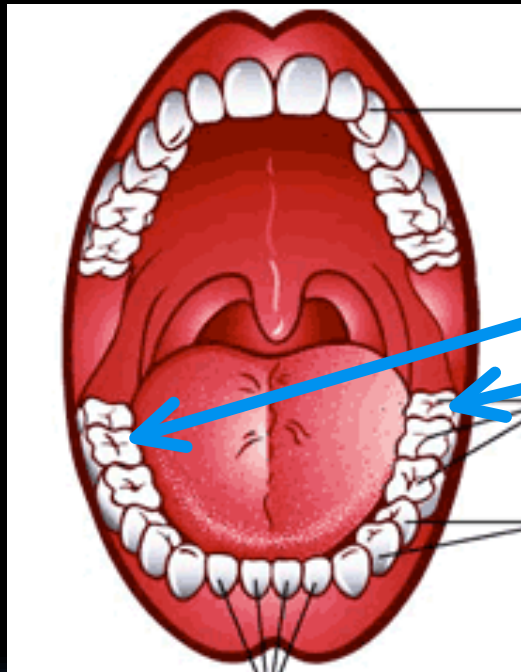
Solution



Obesity has now become such a global issue that in 1997, the World Health Organization (WHO) formally recognized it as a global epidemic.² According to the organization's statistical data, there are approximately 1.6 billion overweight and over 400 million obese adults worldwide. It also reports that these numbers will continue to grow, soon replacing old public health concerns such as malnutrition and infectious diseases, and becoming the most significant cause for serious diseases.¹

One of the most non-invasive and effective ways to prevent obesity and lose weight has been found to be keeping record of food consumption and counting caloric intake: According to the largest weight-loss studies ever conducted, people who wrote down what they ate lost twice as more weight as those who did not.⁴ However, keeping an exact record of what one ate could be a burdensome task, as many of us do not know or tend to under-estimate the calories in food.

PROJECT PROPOSAL



A microchip sticker will be designed to detect the identities of proteins, carbohydrates, and fats upon contact. This device will be small enough to be attached two of the inner molar tooth of the target person. The user will be able to continue his or her daily routine without being bothered by the attached microchip. As the person chews the food the device will be in contact with the food and quickly detect the quantity of three of the macromolecules mentioned above.

Project Proposal (cont.)

Carbohydrates: 1 gram = 4 calories

Proteins: 1 gram = 4 calories

Fat: 1 gram = 9 calories

Total Caloric intake= 2,200 kcal

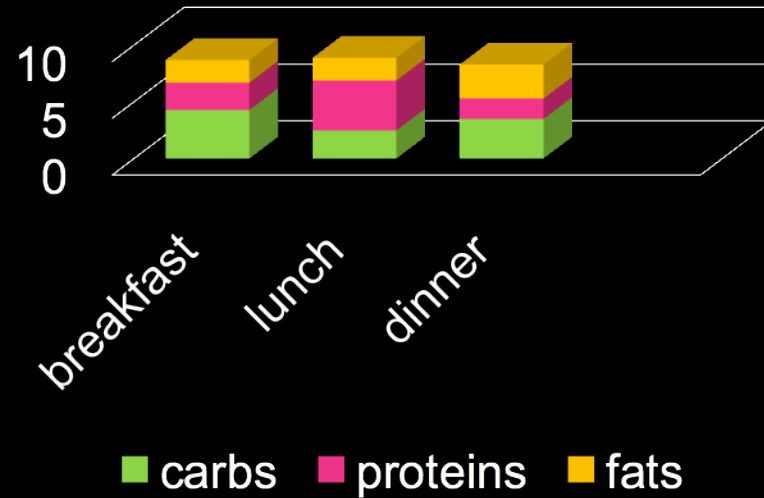
BMI= 22

Goal = 1600 kcal

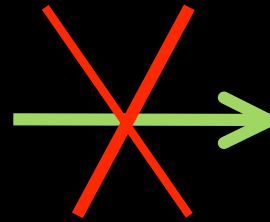
Analysis of Daily food intake

Based on the duration of chewing of a particular food, the detector will determine quantity of the food being chewed, and thus will be able to calculate the total calories consumed for each meal. Then, the microchips are transferred to a device which can connect to a computer and enable visualization of daily caloric intake. It would also calculate from the individual's basal metabolic rate (BMI) the amount of calories needed per day to reach goal weight. Additionally, because calories are broken down to three major macromolecules, the user would be able to tell whether or not he or she is consuming excessive calories in one food group versus another.

Calories on April 26, 2009



Project Proposal (cont.)



Although this project is mainly for measuring caloric intake of food consumed by a person, it could also be equipped with some useful functions that allow avoidance of food poisoning and alcohol poisoning. The device will contain a food poisoning detector that beeps when a person chews spoiled food so that one could distinguish food that shouldn't be eaten. Also embedded in this microchip will be an alcohol detector that also beeps when the blood alcohol level is over the safety limit for alcohol poisoning.

Conclusion

Counting calories of each food consumed or searching for calories in food can be troublesome, but doing so has been found to be the most effective way to lose weight. This project facilitates this task for the individuals and confronts them to watch what they are eating to reduce caloric intake for weight loss. The microchips designed to detect food content and analyze calories upon contact on its surface are attached to a teeth of a person. Further analysis of total calories consumed from each macromolecules (proteins, carbohydrates and fats) are displayed on a computer through a software connected to the microchip. Not only could this project revolutionize the way of controlling caloric intake but it can also serve to prevent food poisoning and alcohol poisoning by a beeping system inserted in the device. Future project direction could perhaps be able to detect exact types of food and generate a nutritional label for each food consumed, but this will require a more advanced technological tool.

References

1. "Obesity and Overweight." *World Health Organization*. 2009. <http://www.who.int/mediacentre/factsheets/fs311en/index.html>>
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4. "Using Food Diaries Doubles Weight Loss, A Study Shows." *USA Today*. 2009 < http://www.usatoday.com/news/health/weightloss/2008-07-08-food-diaries_N.htm>

Bibliography / Links

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2. "The Global Epidemic of Obesity: An overview". *Epidemiology Rev* **29**: 1–5.
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6. "Using Food Diaries Doubles Weight Loss, A Study Shows." *USA Today*. 2009 <
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