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| |  | | --- | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |  | | --- | | h | | **��introduction** | |  | | Teeth and their role in society is an interesting subject. Not always have they been the status and sex symbol that they are today. In these days of television, movies and celebrities making millions of dollars, white straight teeth are an important aspect of what we call beautiful. Our western society is obsessed with clothes, makeup, etc that make one appear healthy. A voluptuous woman with large hips is attractive because she is healthy for childbearing. Teeth are much the same. If one is willing to spend enough time cleaning one’s teeth and making them straight, personal hygiene is obviously a priority. This is interesting because this emphasis on clean teeth has not always been with humans. From the days of early Homo sapiens through the medieval times and beyond, clean teeth were of relatively low (or nonexistent) importance. This makes sense, as one would naturally spend more time hunting or saving one’s life than cleaning one’s teeth. In ancient Russia, rosy cheeks and a white face were considered extremely attractive for both men and women. The problem in Russia was the ugly brown, green and crooked teeth. They solved this problem by painting their teeth black, both to hide the decay, but also to create a contrast with their face. This societal change from indifference to obsession has spurred a great boom in the teeth straightening and teeth whitening businesses and provides for an interesting area of study. | |  | | Our modern society, not the ancient world, provides for the most diverse range of dental topics. Both parents and individuals go to great lengths to correct their smile. Parents are willing to pay thousands of dollars to fix their son’s or daughter’s smiles. Children are taught from the moment that they can hold a toothbrush to brush religiously after each meal and to floss once a day. Where braces were once considered cosmetic, they are now considered a necessity. Advances in dentistry and orthodontics have all but eradicated the imperfect smile; straight teeth have become commonplace and are the norm. One niche of the dental industry is following much the same path as braces once did. Teeth whitening was once an expensive procedure, only available to movie stars and celebrities. In 2000, however, teeth whitening was a $600 million industry, growing 15 to 20 percent each year (E-Dental), and available to a large number of patients. | |  | | For most people, tooth decay is difficult to escape. Tooth decay occurs after a buildup of plaque on teeth. As sugar and starchy foods are consumed, bacteria in the plaque ferment the debris left on teeth. After the bacteria ferment the sugars and starch into acid, these acids break down the calcium and dentin in enamel, thus destroying it (Britannica). Depending on the severity of the breakdown, the enamel may be slightly discolored or completely destroyed, causing caries (Britannica), commonly known as cavities. Americans have a tendency to eat sweets and candies and drink sodas in between meals. This can be even more dangerous for teeth than eating those same foods during a meal and brushing afterward (Federal). If consumed during a meal, debris from the sugars and starches are less likely to remain around the teeth. Brushing after eating these foods will remove both the debris and the plaque. | |  | | In order to prevent the discoloration of teeth and the formation of caries, dentists recommend brushing after every meal and flossing daily. Our modern society has become so obsessed with clean, white teeth that many companies capitalizing on the trend. Nearly every product meant to go in your mouth, from toothpaste to floss, comes in a whitening formula. | |  | | Quite possibly the most effective method of preventing tooth decay was on a grand scale. The idea of adding fluoride to water to prevent tooth decay was introduced in the 1930s. It was discovered that peoples living in areas with naturally high fluoride concentrations had remarkably low rates of decay. Through several studies conducted between 1940 and 1955, it was confirmed that fluoride was protecting teeth. These studies found that fluoride worked best on children, but also showed that adults benefited as well (CDC). Further study revealed that fluoride protects teeth in two ways, when it comes in direct contact with teeth and when it is absorbed from drinking water during the tooth forming years and later (CDC). As the results of many studies showed that fluoride is healthy for teeth, it was added to metropolitan water supplies. In the year 2000, more than 144 million United States citizens will have fluoride in their water (CDC). The added fluoride in water supplies and the wide availability of dental products enhanced with fluoride has caused a steady decline in both overall decay and cavities in the United States. For more information about fluoride’s effects on tooth enamel, click here (Astoria). | |  | | Many parents and children pride themselves on having or being "Crest Kids." A "Crest Kid" is a child with not exceptionally clean teeth, but healthy teeth, when they are relatively young. This pride and the resulting emphasis on brushing and cleaning shows our desire to prevent tooth decay and to keep teeth as white and clean as possible. Shows like Sesame Street and Barney teach kids that brushing your teeth at least when you wake up and before you go to bed is very important. More consistent brushing and cleaning has cause an interesting side effect. Children and teenagers are rarely afraid of their dentists. Dentists are either viewed as just another doctor who smiles and says "keep up the good work" or as a family friend with sound advice and candy after each visit. This view of dentists is quite different from most of these children’s parents. Because of such good brushing and a lack of cavities and decay, dentist’s offices are much less traumatic than they were for children’s parents. Children are rarely terrified of their dentist. But then this good relationship with dentists makes children both more aware of the need for clean teeth and gives them the desire to clean their teeth regularly. | |  | | When brushing with whitening toothpaste on an electric toothbrush and regular flossing don’t make one’s teeth white enough, bleaching is commonly the answer. Teeth bleaching has in recent years become a simple and painless procedure which can be performed at the dentist’s office or at home. Both procedures work in much the same way, the only difference being the strength of the chemicals used in the dentist’s office. When performed at home, a patient is fitted with a special tray which is worn at night. Before wearing the tray, the patient puts a small amount of the chemical carbamide peroxide, a harmless bleach (ADS). If performed by the dentist, the only difference is the concentration of the carbamide peroxide. | |  | | Many other products are meant to whiten teeth and protect against decay after meals of any kind. If whitening toothpaste, gum, etc were altered to protect against specific types of foods, they may be much more effective. For example, if Trident Advantage whitening dental gum packages came with a pieces to chew after eating acidic foods, sugary foods, starchy foods, etc, each having a different concentration of Recaldent (Bonlac), the main active ingredient, they may whiten and protect much better. It is agreed by dental professionals that both sugary foods and acidic foods can significantly damage teeth, but which damages teeth the most? With my project, I hope to find which types of common beverages and substances damage and discolor teeth the most. This information would suggest how much Recaldent would be needed to optimize gum or toothpaste to protect teeth. | |  | | I chose this project because my parents paid thousands of dollars and I spent many years in braces to get good teeth. My braces were recently taken off and I’ve since become interested in whitening and how it works. A project about teeth and what substances damage teeth is interesting to me and would provide useful information for my life. | |  | | I discovered this project on a website about science fair projects. This website didn’t provide specifics for the project, only stating that the investigator should "obtain teeth and subject them to various substances". I decided that I would use common substances found in an everyday diet and that were diverse in their acidity and sugar and starch concentrations. What proved most difficult was obtaining human teeth. My personal dentist was not able to give me any and even if he had, I found the idea slightly disgusting. One idea suggested to me was to use animal teeth from a butcher. I could not, however, find a butcher who could give me any. I was ready to choose a different topic when my father suggested I simulate teeth. This idea intrigued me and I did more research about teeth and tooth enamel. I found that human tooth enamel is 96 per cent Hydroxyapatite (Fitzharris). I did further research into this chemical and found a company, Berkeley Advanced Biomaterials ([www.hydroxyapatite.com](http://www.hydroxyapatite.com/)), who specializes in selling blocks of Hydroxyapatite for tooth and bone research. I contacted them about purchasing several 1 cm cubes, but they informed me that this would cost around $350. After a lengthy discussion about educational rates and less expensive blocks, the sales rep said that the company would be able to donate 10 reject blocks of the size I needed. With these blocks, I was able to complete the project. | |  | | [**top/\**](#gjdgxs) | |