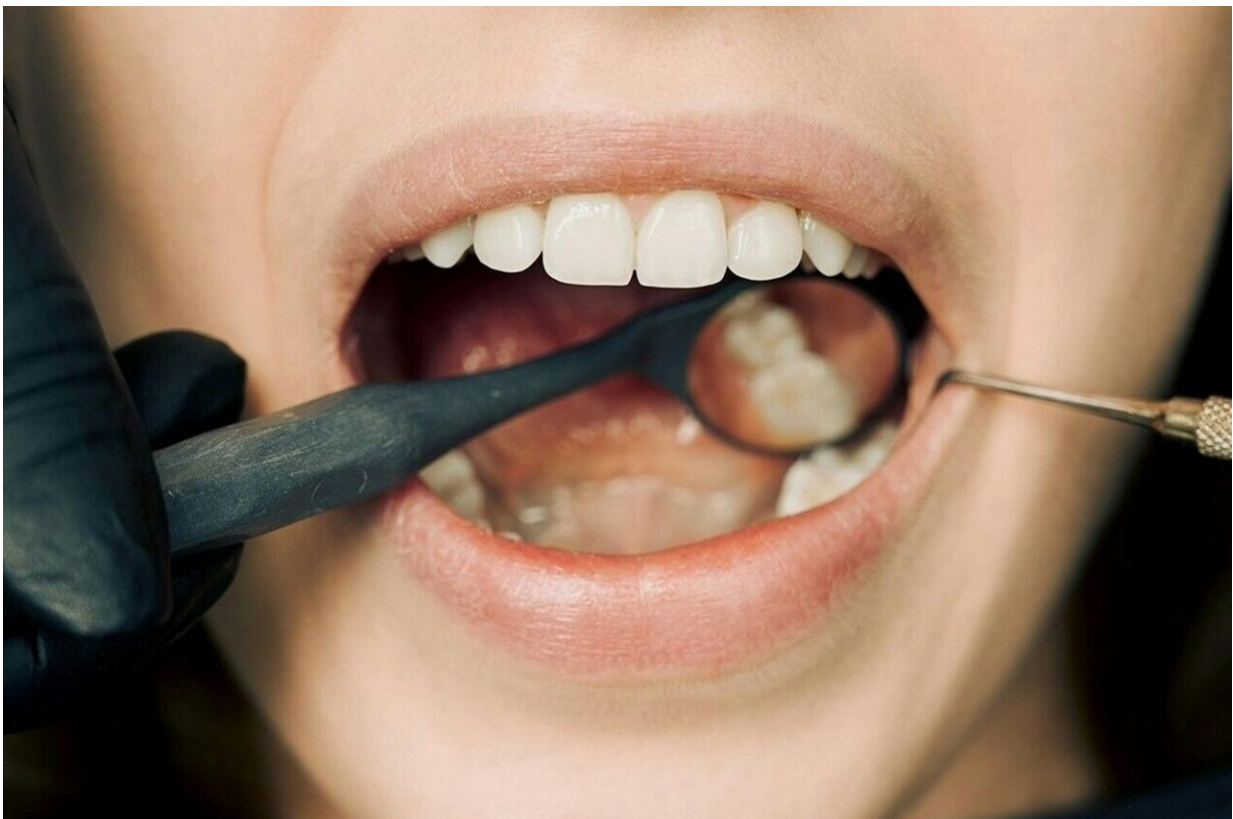


Healthy teeth are wondrous and priceless: Dentist explains why and how best to protect them

May 4 2024, by Samer Zaky



Credit: Arvind Philomin from Pexels

At an auction in England in 2011, one of John Lennon's teeth sold for [just over US\\$31,000](#).

How much are your teeth worth?

Teeth are amazing little miracles. They [light up our smiles](#), we [use them to speak](#) and we [chew with them more than 600 times at every meal](#).

Yet, in a society where 1 out of 5 Americans ages 75 and up [live without their teeth](#), many people may not realize that teeth are designed to stay with us for a lifetime.

I'm a dentist and an [assistant professor](#) spanning clinical dentistry and [craniofacial regeneration](#) research. Researchers like me are still deepening our understanding of tooth development, with the ultimate goal of serving patients with [on-demand regrown ones](#).

In the process, I have developed reverence for natural teeth and for the complex beauty of these biological and mechanical masterpieces.

Designed for lifelong function

The secret of teeth longevity lies in their durability as well as in how they are anchored to the jaw—picture a hammer and its hand grip. For each tooth, durability and anchorage are functions of the complex interface between six different tissues; each alone is a biological marvel.

For anchorage, the [cementum](#), [ligament](#) and [bone](#) grip the tooth at its root portion that is buried under the gum. The ligament, a soft tissue that is about 0.2 millimeters wide (about the diameter of four hairs), attaches the cementum of the root on one end to the bone of the jaw on the other

end. It serves to anchor the tooth as well as to cushion its movement during chewing.

For durability, however, the secret lies in the enamel, dentin and pulp—our focus in this discussion.

Enamel—the shield

The enamel is the protective shell that covers the visible part of the tooth above the gum. Thanks to its high mineral content, enamel is [the hardest tissue in the body](#). It needs to be, since it acts as a shield against the constant impact of chewing.

Enamel does not contain cells, blood vessels or nerves, so it is nonliving and nonsensitive. Enamel is also non-regenerating. Once [destroyed by decay or broken by misuse](#) such as ice chewing, nail biting or bottle opening—or touched by the dental drill—that part of our priceless enamel is gone for good.

Because it interfaces with a germ-laden world, the enamel is also where decay starts. When acid-generating bacteria accumulate on unbrushed or poorly brushed teeth, they readily dissolve the minerals in the enamel.

Like hair or fingernails, the non-innervated enamel is not sensitive. The decay advances through the 2.5-millimeter thick (tenth of an inch) layer of enamel painlessly. When caught at that phase during a dental checkup visit, the dentist can treat the decay with a relatively conservative filling that hardly compromises the tooth's structural integrity.

Because of its high mineral content, enamel is stiff. Its lifelong support is provided by the more resilient infrastructure—the dentin.

Dentin and pulp—body and heart

With less mineral content than enamel, dentin is the resilient body of the tooth. It is a [living tissue](#) formed of parallel tiny tubes [housing fluid](#) and [cellular extensions](#). Both originate from the pulp.

The pulp is the tooth's soft tissue core. Vastly rich in cells, [blood vessels](#) and nerves, it is the life source of the tooth—its heart—and the key to its longevity.

Like [smoke detectors](#) communicating with a remote fire station, the cellular extensions within the dentin sense decay as soon as it breaks through the nonsensitive layer of enamel into dentin. Once the extensions communicate the danger signal to the pulp, our tooth sensitivity alarm goes off: The tooth heart is in flames.

The [inflamed pulp](#) initiates two protective actions. The first is to secrete an [additional layer of dentin](#) to delay the approaching attack. The second is toothache, a call to visit the dentist.

The earlier the visit, the less the drilling and the [smaller the filling](#). If caught in time, most of the tooth's natural tissues will be preserved and the pulp will likely regain its healthy state. If caught too late, the pulp [slowly dies out](#).

Without its heart, a nonliving tooth has no defense against further decay invasion. Without a hydration source, a [dried-out dentin](#) will sooner or later break under the forces of constant chewing. Besides, a tooth that has already lost a significant portion of its natural structure to decay, [cavity preparation or root canal instrumentation](#) becomes weak, with [limited longevity](#).

In other words, the tooth is never the same without its heart. Pulpless, the tooth loses its womb-to-tomb endurance and mother nature's lifelong warranty.

The tooth coming together

More complex—and more precious—than a [pearl within an oyster](#), the formation of a tooth within our jawbone involves layered mineral deposition. As [tooth development progresses](#) in a process of ultimate cellular engineering, the cells of the six aforementioned tissues—[enamel](#), [dentin](#), [pulp](#), cementum, ligament and bone—multiply, specialize and mineralize synchronously with each other to form uniquely interlocking interfaces: [enamel to dentin](#), [dentin to pulp](#), [cementum to dentin](#) and [cementum to ligament to bone](#).

In a [progress akin to 3D printing](#), the tooth crown grows vertically to full formation. Simultaneously, the root continues its elongation to eventually launch off the crown from within the bone across the gum to appear in the mouth—the event known as teething. It is about that time, around 12 years of age, that our set of adult teeth is complete. These pearls are set to endure a lifetime and are undoubtedly worth preserving.

Save your teeth, visit the dentist

Tooth decay, [the most prevalent disease in humans](#), is both [predictable and preventable](#). The earlier it is caught, the more the tooth integrity can be preserved. Since the process starts painlessly, it is imperative to visit the dentist regularly to keep those insidious germs in check.

During your checkup visit, the dental professional will clean your [teeth](#) and check for early decay. If you are diligent with your [daily preventive measures](#), the good news for you will be no news—enough to make anyone smile.

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