



Teeth

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Field(s) of Interest: Biology and dentistry

Brief Overview:

In this lesson, mentees will have the opportunity to learn about the structure of teeth and how they vary in size and function. They will also explore different dental procedures that help strengthen and repair teeth. Finally, mentees will learn proper brushing techniques to prevent cavities and maintain a healthy smile.

Agenda:

- Introduction **(5 min)**
- Inside the Tooth: Title of Module **(10-15 min)**
- Tooth in Repair: Title of Module **(20-25 min)**
- So Fresh and so Clean: Title of Module **(10-15 min)**
- Conclusion **(5-10 min)**

Main Teaching Goals/Key Terms:

- Dental alveoli
- Periodontal ligament
- Tooth root
- Crown
- Incisors
- Canines
- Premolars and molars
- Deciduous teeth
- Enamel
- Dentin
- Plaque
- Cavity
- Toothfilling
- Bone reabsorption
- Bone formation
- Flossing
- Tooth brushing
- Fluoride
- Mouthwash

Background for Mentors

Module 1

- Dental alveoli
- Periodontal ligament
- Tooth root
- **Cementum**
- Crown
- Incisors
- Canines
- Premolars and molars
- Deciduous teeth

Our teeth play an important role in our daily lives, helping us speak and eat properly. To function well, each tooth needs to be positioned securely in place. Inside the jawbone are small hollow sockets called **dental alveoli**, where our teeth grow. Within each alveolus is a tough, fibrous band known as the **periodontal ligament**. This ligament is essential for tooth stability as its connective fibers tightly anchor the inner part of the tooth, called the **root**, keeping teeth steady while chewing. It also contains blood vessels and nerves that provide nutrients and help control chewing pressure.

Similar to the periodontal ligament, the **tooth root** serves as an anchor as it lies deep within the gums. The root is rich in blood vessels, making it very sensitive. To protect it, the root is covered by a calcified connective tissue called **cementum**. Above the gums, the visible portion of the tooth is called the crown, which acts as a protective cap.

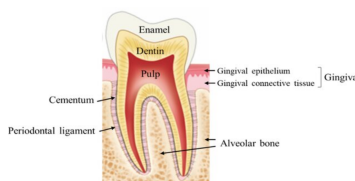


Figure 1: The structure of periodontium

While all teeth are held in place the same way, they differ in size, shape, and function. **Incisors** are thin, flat teeth located at the front of the mouth that help us bite into food. Next to them are the **canines**, which are cone-shaped with sharp tips that allow us to tear food. Farther back are the **premolars** and **molars**, which have broad, ridged surfaces that are perfect for grinding and chewing.

As our bodies grow, our jaws grow too. To support this transition, a set of 20 **deciduous teeth**, also known as baby teeth, develop first. Once these fall out, they are replaced by 32 permanent teeth, which last into adulthood.

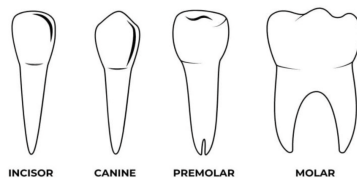


Figure 2: Teeth names and structure

Module 2

- Enamel
- Dentin
- Plaque
- Cavity
- Toothfilling
- Bone reabsorption
 - Osteoclasts
- Bone formation
 - osteoblasts

Given the variety in our diets, our teeth are exposed to many different types of foods, some sugary, acidic, or starchy. To protect the inner parts of our teeth, the crown is covered with a hard outer layer made of mineral crystals called **enamel**. Beneath the enamel is a second layer of mineralized tissue known as **dentin**, which surrounds the root and adds extra protection.

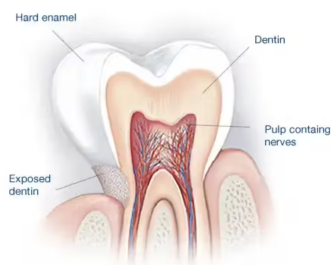


Figure 3: Enamel and Dentin Layers

While enamel helps protect our teeth, food often leaves behind residue after we eat. If this residue stays on our teeth for too long, it can form a sticky film called **plaque**. Plaque buildup is harmful because the bacteria produces acid that damages the enamel. Once the enamel is weakened, it can lead to small tooth decay holes, also known as cavities. To treat cavities, dentists use **tooth fillings** to stop further decay and restore the tooth's original shape. Fillings can be made of materials such as porcelain or resin, and in the past, they were often made of metal, like amalgam.

During the transition from baby teeth to adult teeth, it's common for teeth to shift and for small gaps to form between them. To help correct this, another type of dental procedure used is called braces. Braces are made up of two main components: brackets, which are glued to the surface of each tooth, and an archwire, the metal wire that runs through the brackets.

When gentle pressure is applied to one side of a tooth, it stimulates **osteoclasts**, the cells responsible for breaking down bone tissue. This process, called **bone resorption**, creates space for the tooth to move. At the same time, the tension on the opposite side of the tooth activates **osteoblasts**, the cells that form new bones. These cells fill in the space left behind as the tooth shifts, ensuring the stability of its new position. This process is known as **bone formation**.

Module 3

- Flossing
- Tooth brushing
 - Circular motions
- Toothpaste
 - Fluoride
- Mouthwash

While cavities can happen, there are many ways to prevent them and keep our teeth healthy. One important step is **flossing**. Flossing helps clean and remove food stuck between teeth, reducing bacteria and plaque buildup in the mouth.

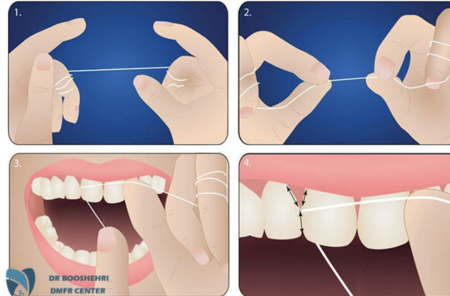


Figure 4: Flossing

Another key part of keeping teeth strong and healthy is **teeth brushing**. Before brushing, we apply **toothpaste** to our toothbrush, a paste with a slightly gritty texture that helps scrub away residue. Many toothpastes contain **fluoride**, a mineral that strengthens enamel, removes plaque, and helps protect teeth from acidity. To clean effectively, it's important to brush in circular motions, paying special attention to the areas near the gums, since these spots are more prone to plaque buildup.



Figure 5: Brushing

For an extra step toward a clean and fresh mouth, **mouthwash** can be used after brushing. Mouthwash helps remove leftover bacteria that brushing might miss. However, while it's helpful, mouthwash alone isn't enough to remove all plaque and bacteria. That's why brushing two to three times a day, along with flossing, is essential for maintaining a healthy smile.

Introduction

Concepts to Introduce ● Flossing ○ Using a thin thread to clean in between teeth ○ Connect this to the flossing dance. Do it for your mentees. Explain the similarities. ● Types of teeth ○ Analogize teeth to real world objects ■ Incisors: scissors (cut) ■ Molars: mortar and pestle (or a similar grinder) ■ Canines: fork (tears) ● Braces ○ You can think of your teeth as people all trying to fit through a door. If they are all over the place, things easily get cramped. In a single file line, everyone fits. Braces help everyone get in a straight line.	Questions to Pique Interest ● Have you ever had a cavity before? What caused it? ○ Poor oral hygiene or sugary foods allow bacteria to build up and attack our tooth enamel. ● Have you ever lost a tooth? Maybe multiple times? Did they look different from each other? ○ Mentees should be able to recognize that our teeth look different. Teeth in the back are typically larger and flatter while teeth in the front are sharper. ● Do all animals have the same kinds of teeth? Sharks vs giraffes? How do Humans compare? ○ Sharks have big pointy teeth while giraffes have duller teeth. Humans have a mix of all different kinds of teeth.
Scientists, Current and Past Events ● Pierre Fauchard is coined "the father of modern dentistry" for establishing the basics of current day dental practices and knowledge. He also created dental prosthesis. ● People began using a form of toothpaste made from egg shells, pumice, and salt as early as 5000 BC! ● Researchers recently discovered the perfect environment to grow stem cells into teeth in hopes of replacing fillers ○ Link!	Careers and Applications Careers ● A dentist is an oral healthcare provider, they diagnose and treat oral health issues. ● A hygienist focuses on preventative oral healthcare and educates patients on oral hygiene. ● Orthodontists specialize in teeth alignment and bite correction. ● We see the role of teeth in everyday life such as eating. Some of us may have gotten cavities due to the food we eat. Sometimes the alignment of our teeth requires us to have braces or wear retainers to keep them in place.

Module 1: Inside the Tooth

In this module, mentees will have the opportunity to build a tooth model. Through this hands-on activity, they will learn about the importance of tooth structure and how teeth stay securely in place.

Teaching Goals List and explain/define the 1-3 main concepts you want to focus on <i>for this specific module</i>. For example... 1. Dental alveoli- bony socket for the root of a tooth 2. Periodontal ligament- tough, fibrous band 3. Root- anchors tooth to jaw 4. Crown- part of the tooth that is exposed 5. Incisors- front teeth used for cutting and slicing food. 6. Canines- pointed teeth that help with tearing food 7. Premolars and molars- grinding and chewing 8. Deciduous teeth- baby teeth	Materials Per student ● ¼ sheet light pink construction paper ● 5 packing peanuts ● Pair of scissors ● Glue dots 10
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Different Methods for Teaching **in collaboration with MD*

Anatomical Structures: Especially for the root, crown, and alveoli, it may be nice to draw it on the whiteboard if available in the class, so they have a visual representation of how a whole tooth looks like.

Deciduous Teeth: Ask mentees if anyone has ever lost a tooth before. How did it happen? Do they have another tooth in that spot now?

Incisors and Molars: Have mentees imagine they're chewing gum or eating some candy. What part of their mouth/teeth are they using? Now ask them to imagine taking a bite out of a hamburger or pizza. What part of their teeth are they using now?

Procedure

1. Have students cut packing peanuts in half and use sticky tabs to stick each tooth onto pre cut gum template (5 teeth on top 5 on bottom works best)



Figure 6: End result

Classroom Notes

It's easier to use sticky tabs by opening them, attaching them to the paper (for the mouth), and then removing the original plastic—kind of like a bandaid! If you just take off the sticky tab then put it on the paper, it might stay stuck on your hand instead of sticking to the paper 😞 Make sure mentees don't squish the packing peanuts!! That's their teeth and then they will struggle with the next activity

Module 2: Tooth in Repair

In this module, mentees will have the opportunity to simulate cavity development and repair, as well as explore how braces work. Through these hands-on activities, they will gain a better understanding of how these procedures help maintain dental health and why preventing cavities is important.

Teaching Goals 1. Enamel- hard outer layer of tooth made of mineral crystals 2. Dentin- second layer of mineralized tissue found under enamel 3. Plaque- sticky film on teeth 4. Cavity- tooth decay 5. Tooth Filling- repair for tooth decay 6. Bone reabsorption- break down of bone tissue 7. Bone formation- formation of bone tissue	Materials Per student • 1 Q tip • 5 beads • 1 piece of string ~ 6" • 5 glue dots Per group: • 1 cup of Water • Playdough
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Different Methods for Teaching In this activity we are using water to “break down the teeth.” Have mentees brainstorm their own examples of drinks that could cause tooth decay and represent the water, such as soda or juice.

Emphasize that in the real world these two dental procedures happen separately and so we must also do one before moving on to the other. Your teeth would need a break from all that work!

Procedure

Cavities:

1. Have students dip a q-tip into water and poke holes on the bottom row of teeth
2. Use playdough to fill in the holes

Braces

1. Use sticky tabs to place bead onto each tooth on the top row
2. Insert string through beads
3. Use sticky tabs on end of string to secure in place



Figure 7: Cavity example



Figure 8: Braces example

Classroom Notes Demo decaying one tooth in front of the class, making sure to only make a small hole. Mentees may go overboard and try to decay their whole tooth away. Emphasize that if they do this, they won't have teeth to put braces on!

Module 3: So Fresh and so Clean

In this module, mentees will get a visual understanding of why each step of dental hygiene is important for keeping teeth clean and healthy. Through this activity, they will recognize the value of maintaining a consistent routine and feel more confident in their own teeth cleaning habits.

Teaching Goals 1. Flossing- Cleaning between teeth with dental floss 2. Toothbrushing- using toothbrush to remove plaque a. Circular motions 3. Toothpaste a. Fluoride- mineral that plays an important role in oral health by strengthening teeth and removing plaque 4. Mouthwash- liquid solution swished in the mouth to improve oral hygiene by reaching areas brushing might miss	Materials - Mentees
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Different Methods for Teaching

Toothpaste vs. Mouthwash: Open it up for discussion! You can ask mentees what they think are some similarities and differences between the two. Which one helps clean the nitty gritty corners of your mouth? Which one might help kill bacteria fast?

- Any favorite flavors???    

Flossing: If you have a whiteboard in the class, draw out a few teeth and the gums. Circle the areas where you should be flossing (gently on the sides, between the tooth and the gum. NOT forcefully into the actual gums.)

Brushing: Is the best way to brush up and down, side to side, or in circles? Ask this question to the class. Explain brushing in small circles is best because it helps get to hard to reach crevices. You may hear your hygienist tell you this same information!

Procedure 1. Have 7 mentees volunteer: 6 to act as teeth and 1 will simulate tooth hygiene process 2. Have 3 mentors available to participate as food in teeth 3. Have mentors stand between mentees to simulate food in mouth. Mentee simulating tooth hygiene routine will play out each step of teeth care: flossing, brushing, and mouthwash. With each step, one mentor will be removed to simulate teeth becoming clean. 4. When simulating brushing, have the mentee	
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start with very gentle and unorganized brushing, making it so the mentor will not move. Then progressively have mentee improve teeth brushing to be circular, then mentor will move. This mimics stubborn food in teeth, which is why proper teeth brushing is important. You know your site best, make it fun for them!	
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Classroom Notes

Let mentees have fun demonstrating teeth and floss, but know when to pause or refocus the activity if students get too enthusiastic and physical (ex. pushing, excessive yanking on other mentees' arms).

Conclusion

To wrap up, have mentees reflect on the different ways they care for their teeth and what methods work best for them. Emphasize the importance of keeping a consistent routine, as it helps their teeth stay strong and healthy as they grow older!