



# Understanding the cause of periodontitis

To understand how gum disease develops and progresses, it is important to look at 2 key concepts:

- Aetiology - The cause or origin of a disease.
- Pathogenesis – The biological processes that occur in the body as a disease develops.

There are 2 types of gum disease:

- Gingivitis – Reversible form of gum disease.
- Periodontitis – Irreversible form of gum disease.

## What causes periodontitis?

We know that the plaque biofilm (bacteria film on your tooth surface) plays a key role in gum disease. However, it alone is not enough to cause periodontitis. Periodontitis involves a complex interaction between:

- A dysbiotic (unbalanced) plaque biofilm.
- Your body's immune response (how your body reacts to the bacteria).

When this interaction happens, it leads to tissue destruction – the irreversible damage to the gums and bone that support your teeth.

## What is dysbiosis?

Think of the bacteria in your mouth as a community. In a healthy mouth, the community is well-balanced and does not cause harm. However, when there is plaque buildup that is not removed, the community changes. Some bacteria that are normally harmless become more aggressive, and new harmful bacteria take over. This change is called dysbiosis, and it is a key step in the progression of periodontitis. Dysbiosis does not just mean an overgrowth of bad bacteria. It also means changes in:

- The types of bacteria in the biofilm.
- The way the bacteria interact with each other.
- The bacteria's metabolic activity (how they grow and survive).

## How does gum disease start?

In healthy gums, your body's immune system works quietly in the background to keep bacteria under control. One key part of this system are the neutrophils – a type of white blood cell that acts as your body's first line of defence against bacteria and infection. However, if plaque biofilm builds up at the gumline (where the tooth meets the gum), the immune system kicks into action. This causes inflammation in the gums, leading to gingivitis. During gingivitis, the gums may bleed, and collagen (the structure supporting the gums) breaks down. Fortunately, with good oral hygiene, gingivitis can be reversed.

## What triggers periodontitis?

If the plaque biofilm is not removed, inflammation from gingivitis can progress to periodontitis. At this point, the disease starts to cause permanent damage to the bone and gums that support your teeth. As the disease progresses, the balance of bacteria shifts – from harmless bacteria to more harmful bacteria that can cause disease. This shift is known as dysbiosis.

Your body's immune system tries to fight off harmful bacteria, but in periodontitis, this response can sometimes do more harm than good. Your immune system sends inflammatory signals to fight the bacteria. These signals cause inflammation in the gums and tissues. Over time, this inflammation causes damage to the tissues and bone that support your teeth. In other words, your immune system is trying to protect you from harmful bacteria, but the inflammatory response ends up damaging the gums and bone in the process.

### **What influences the progression of periodontitis?**

The progression of periodontitis is not the same for everyone. Some bodies are better at managing the plaque biofilm, while others may experience faster progression due to various factors. Factors that may affect the progression of gum disease by affecting the immune-inflammatory response include:

- Genetics
- Systemic diseases - for example, diabetes
- Lifestyle factors - for example, smoking, diet, and stress.
- Microbiome - the types of bacteria in your plaque biofilm.

### **How to manage periodontitis?**

As periodontitis involves both bacterial changes and an immune response, treatment needs to address both factors to be effective.

- Managing the plaque biofilm through good oral hygiene and regular professional cleanings.
- Controlling the immune-inflammatory response by reducing inflammation and addressing lifestyle factors that can affect the response (for example, smoking or diabetes).

By controlling these two areas, it is possible to slow down the progression of periodontitis and prevent further damage to your gums and bone.