

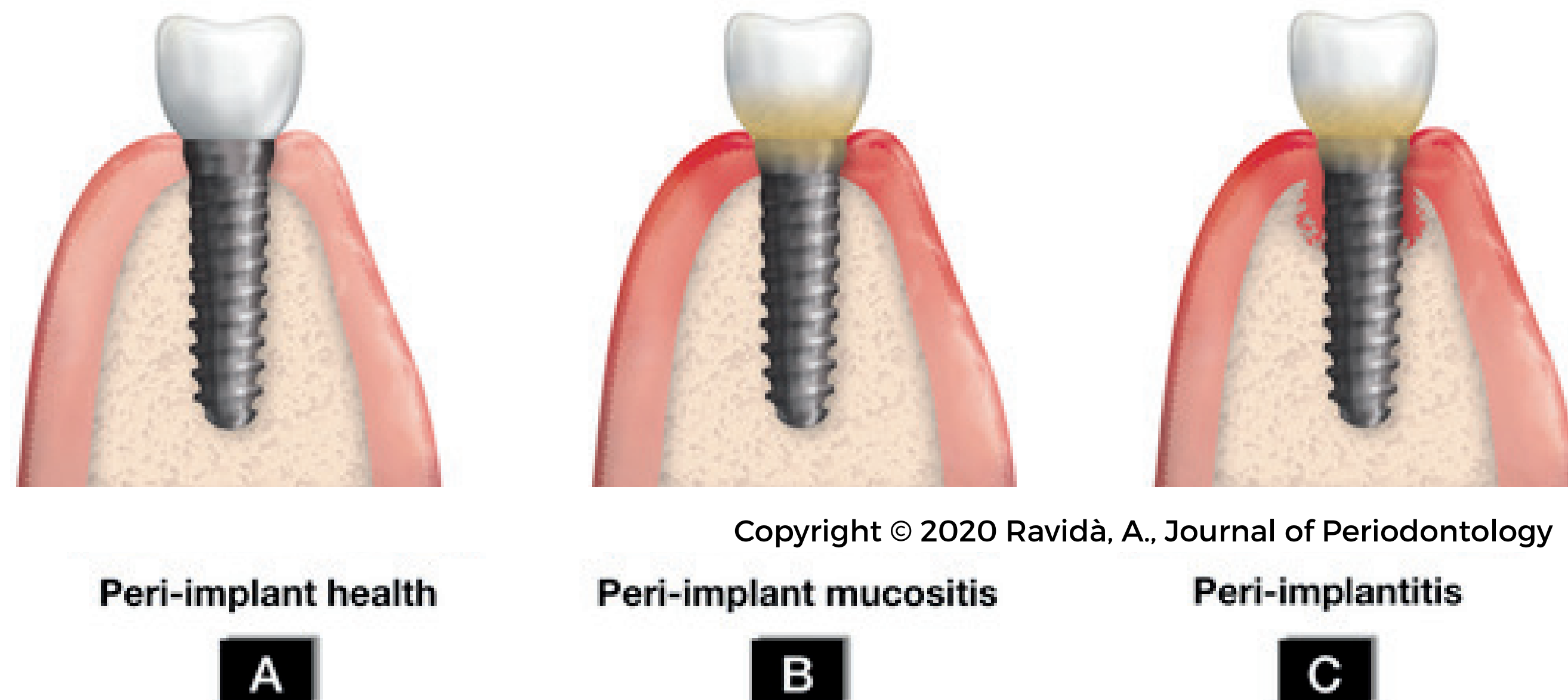
# PeriAlert A Novel Diagnostic Tool for Peri-Implant Mucositis

Team: Stone Meng, Nicole Beaubien, Yuki Hodo, Aditya Jain, Ziyang (Lily) Lin, Gavi Melman, Anna Vargas, Chelsea Wong  
Faculty: Michelle Zwernemann, Emma Turner (Dept. of Biomedical Engineering, Johns Hopkins University)  
Clinical Mentor: Dr. Robert Koski, DMD (Captain, U.S. Airforce)



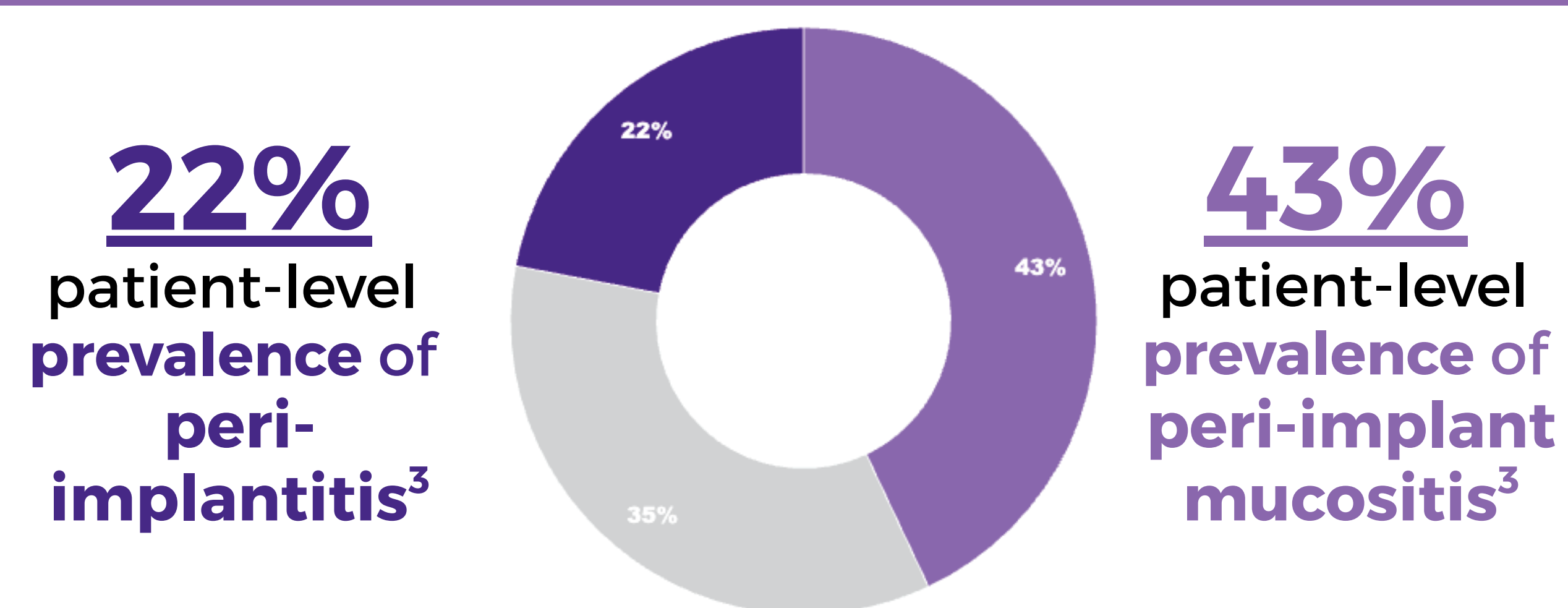
## Clinical Problem

### Peri-implant health before treatment



**Peri-implant mucositis (B)** is an inflammatory gum condition of tissue surrounding a dental implant, causing redness, swelling, and bleeding upon probing. If left untreated, **peri-implantitis (C)** may develop, causing a breakdown of periodontal fibers, bone, and gums, necessitating **implant removal**.

~2.5 million new implants occur per year in U.S.<sup>2</sup>



### Current diagnostic methods are unsatisfactory

Bleeding on probing, radiographic bone, and probing depths:

- 1) have high specificity, but **lacks sensitivity**
- 2) are **not effective in predicting disease activity or progression**

## Project Overview

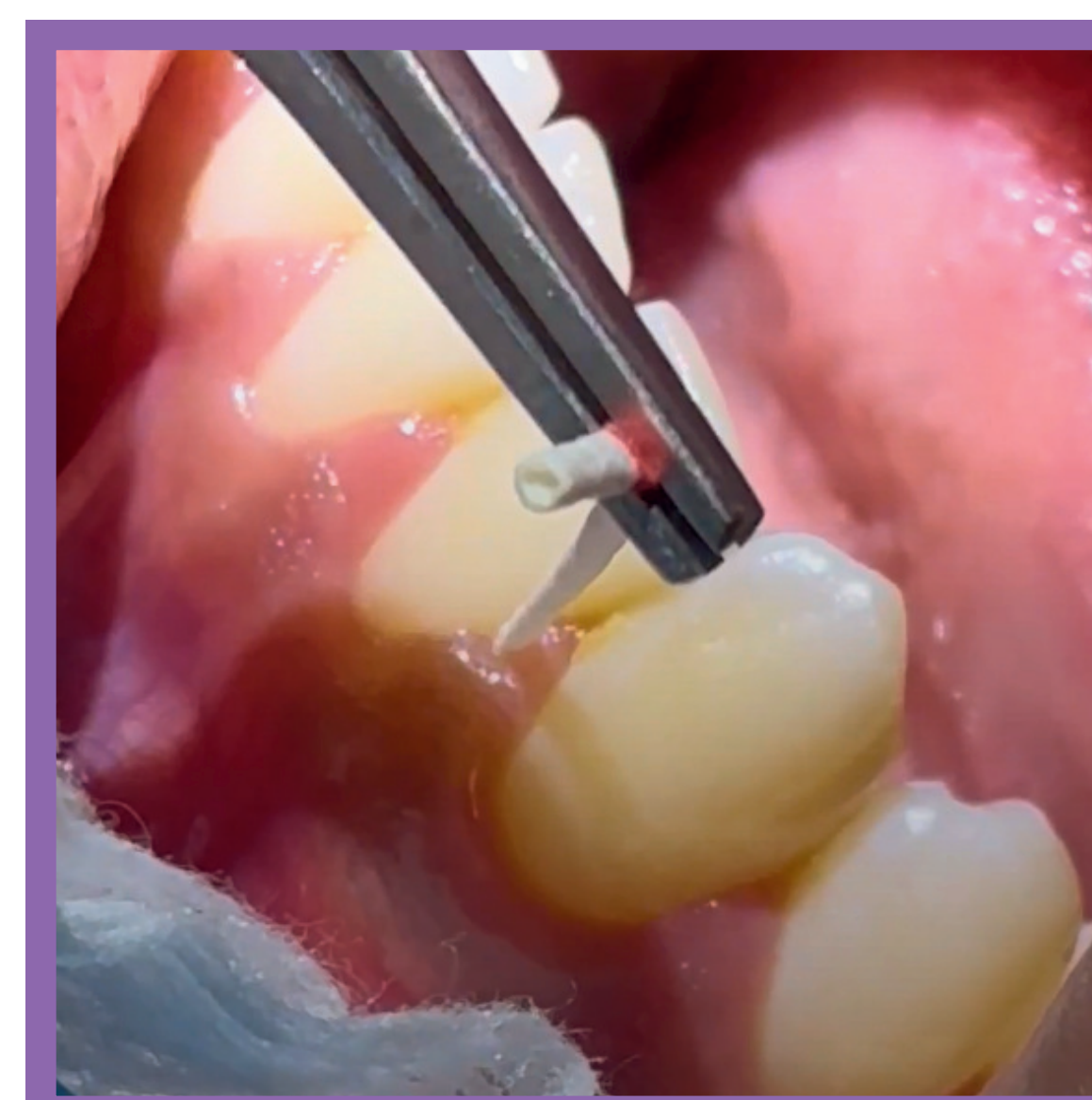
The goal is to **detect peri-implant mucositis**, which may lead to dental implants failure and thus costly revision surgeries. Current methods cannot determine, much less predict, early inflammations. Our method measures the pH of fluids around implants to detect inflammations early with a high sensitivity.

Implant providers need a method **to detect peri-implant mucositis to reduce the incidence of peri-implantitis** to less than 5% post-implantation.

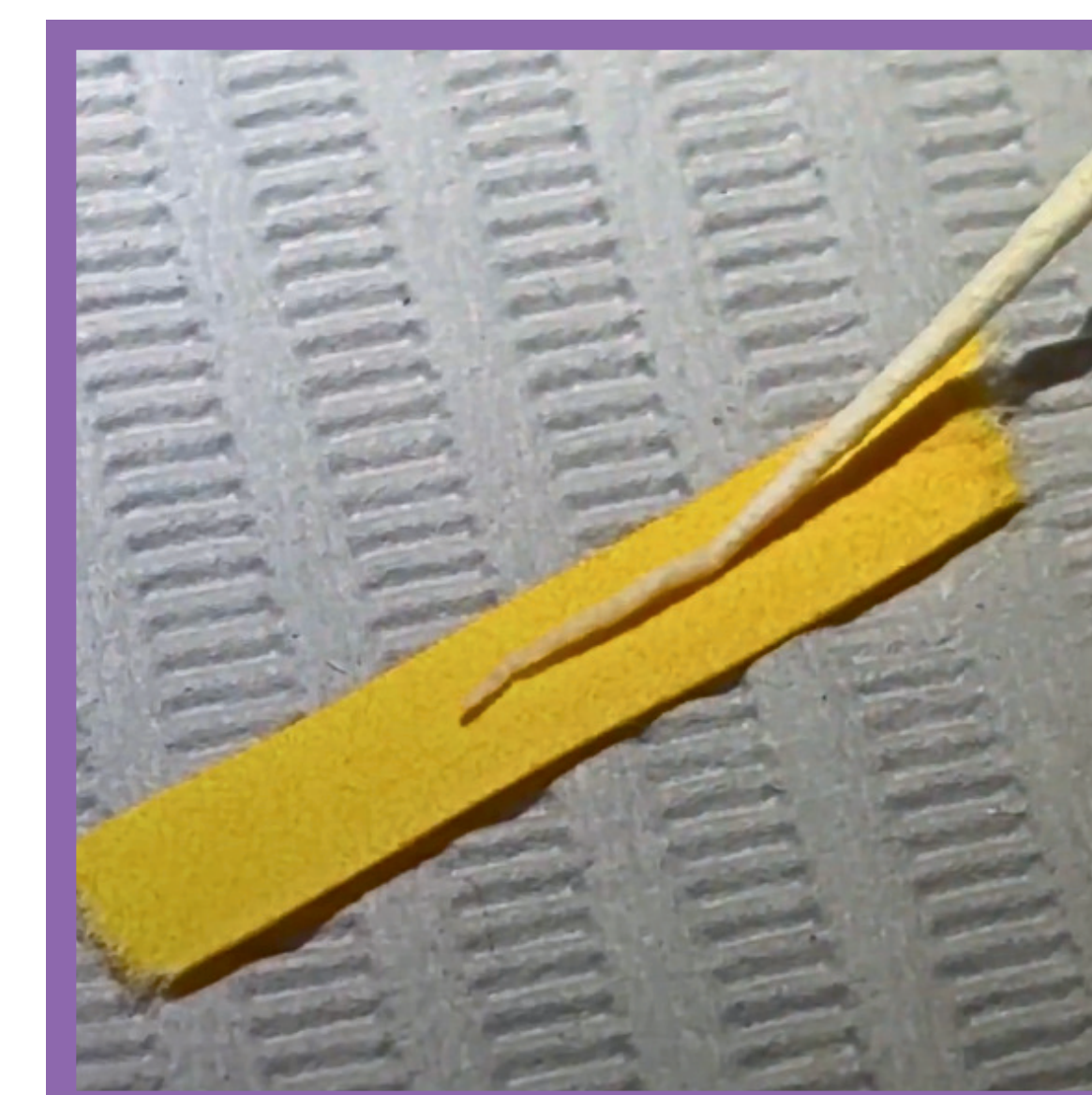
## Our Approach

### Using pH as a marker for peri-implant health

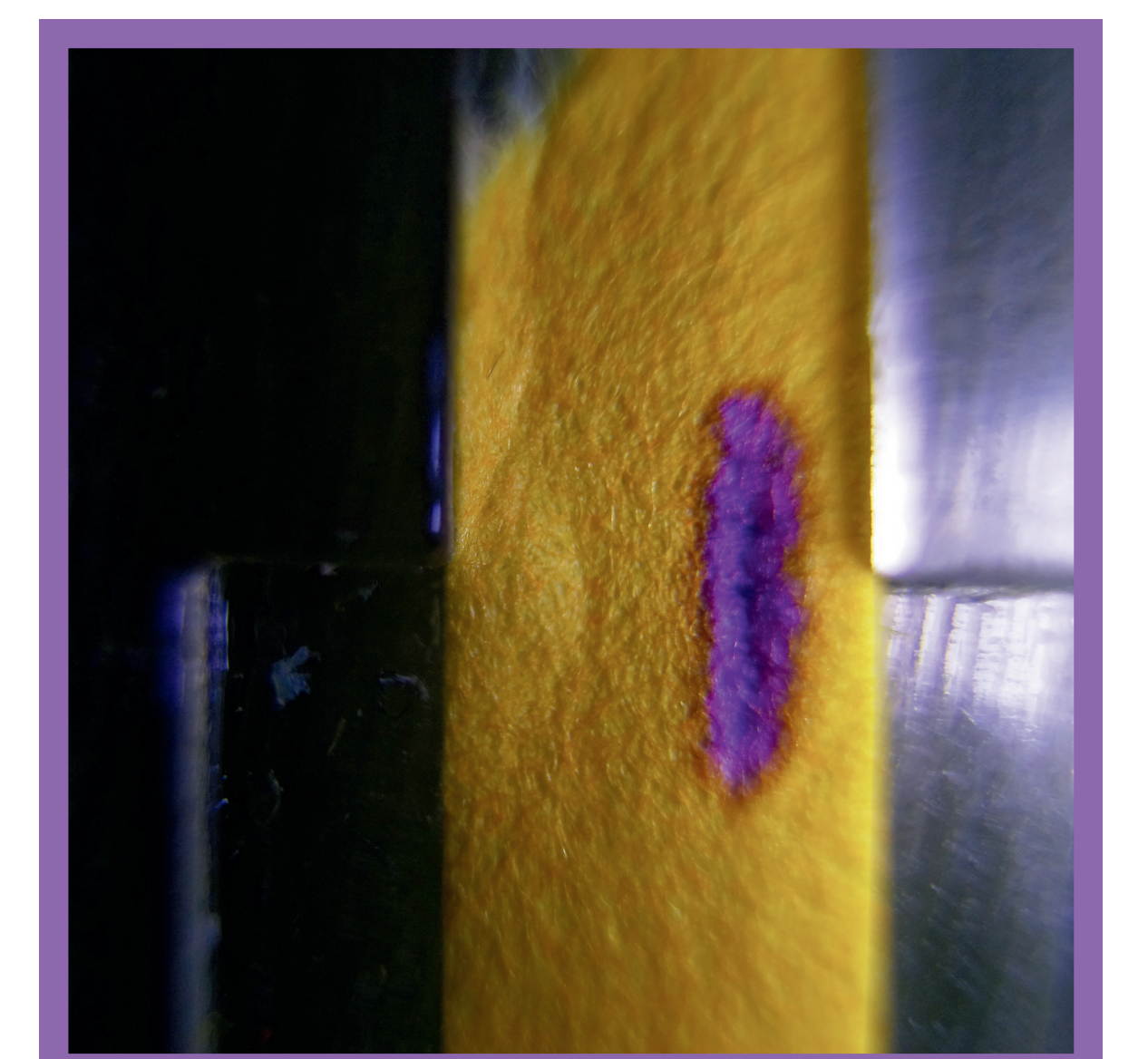
An **early indicator** of peri-mucositis is an **alkaline change in peri-implant crevicular fluid** (PICF) pH. Specifically, healthy and failing implants are classified at  $6.8 \pm 0.4$  and  $7.2 \pm 0.6$  respectively.<sup>4</sup>



Paper points are used to collect PICF from the patient peri-implant sulcus (depth of 1 mm)



0.5 microliters of PICF are transferred onto colorimetric pH paper strips



Camera-based pH paper reader detects RGB value from region of interest, outputting exact pH value

### Cost-effective, accurate, and minimally invasive

Our device enables clinicians and patients to:

- 1) prevent **implant failure** by diagnosing mucositis and gum inflammation early
- 2) ensure **long-term oral health** and preserving the integrity of existing implants
- 3) promote **early non-surgical** intervention

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