

# Impact of Sugar-Free vs. Conventional Toothpaste on Salivary Glucose and pH in Individuals with Type-2 Diabetes

A Randomized Controlled Study

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# Understanding Type-2 Diabetes and Oral Health

## Global Impact

~537 million adults globally have diabetes (IDF 2021).

## Oral Complications

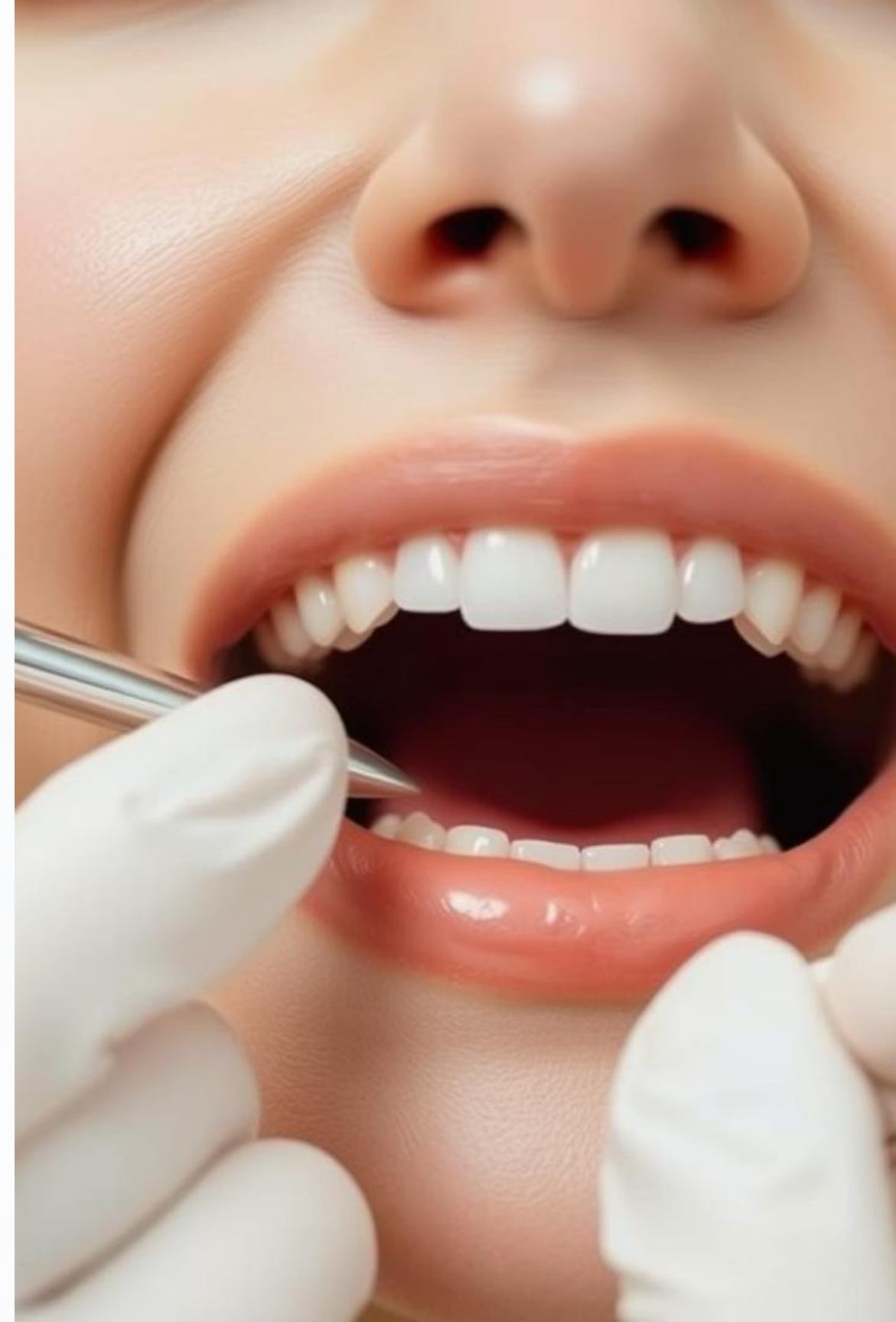
Higher risk of periodontal disease (3x), caries, oral candidiasis.

## Glycemic Control Link

Poor control linked to exacerbated oral issues.

## Salivary Biomarkers

Salivary glucose and pH are key indicators.



# The Challenge with Conventional Toothpaste

## Ingredient Concerns

Many contain sorbitol or xylitol (sugars/sugar alcohols).

## Oral Microbiome

These can be metabolized by oral bacteria.

## Acid Production

Leads to acid environment, increasing caries risk.

## Unclear Impact

Specific effects on diabetic patients often unstudied.



# Study Objectives and Hypotheses



## Primary Objective Objective

Compare salivary glucose levels.



## Secondary Objective

Assess salivary pH changes.



## Hypothesis 1

Sugar-free toothpaste reduces salivary glucose.



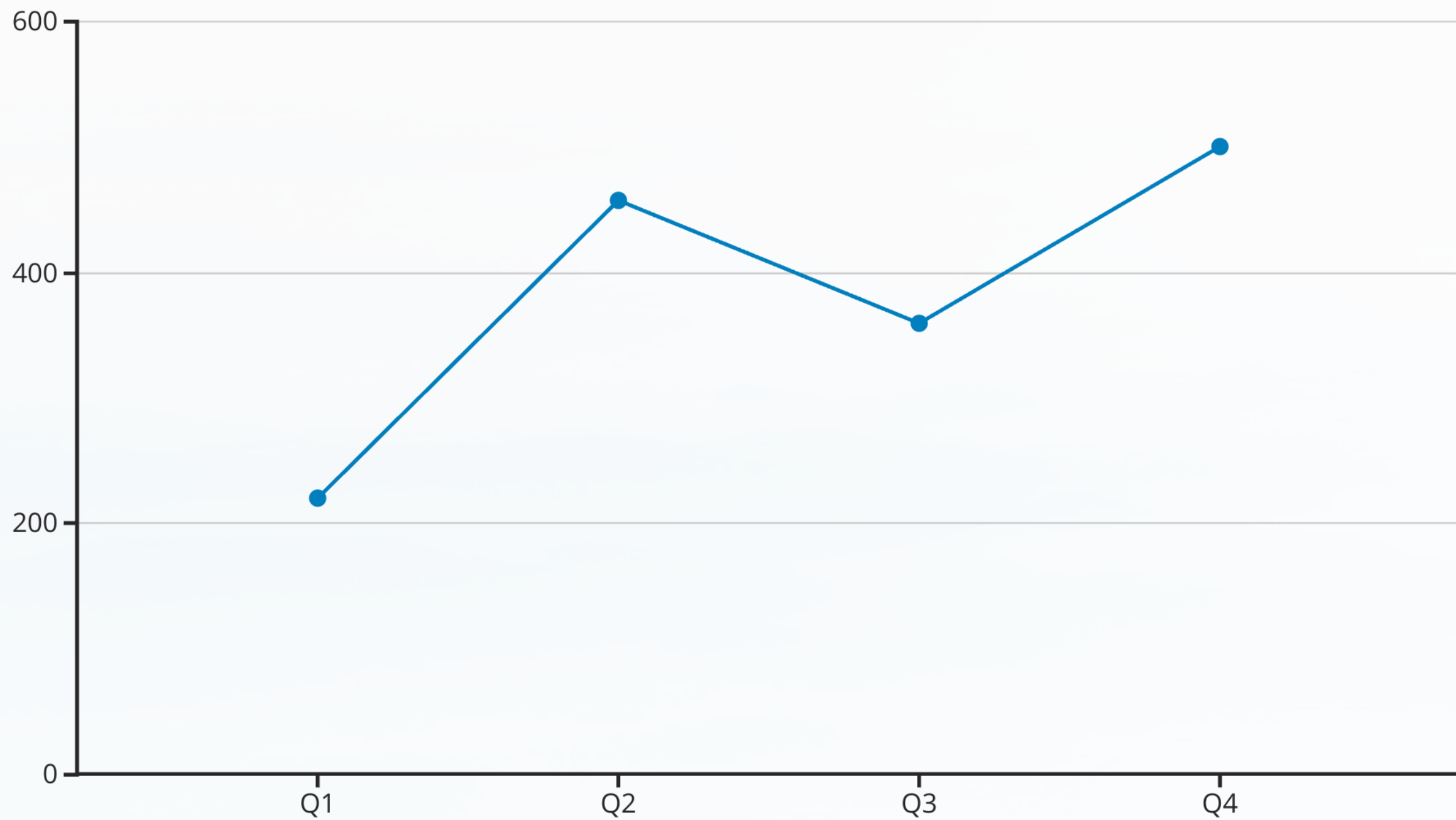
## Hypothesis 2

Sugar-free toothpaste elevates salivary pH.

# Methodology: A Randomized Controlled Trial

| Participants                                             | Study Design                                   | Groups                                                              | Measurements                                   |
|----------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------|
| 60 adults with diagnosed Type-2 Diabetes (HbA1c < 9.0%). | Double-blind, randomized, 8-week intervention. | Group A (Sugar-Free Toothpaste), Group B (Conventional Toothpaste). | Salivary glucose (mg/dL), pH collected weekly. |
| <b>Follow-up</b>                                         |                                                |                                                                     |                                                |
| Baseline, Week 4, Week 8 collections.                    |                                                |                                                                     |                                                |

## Key Findings: Salivary Glucose Levels

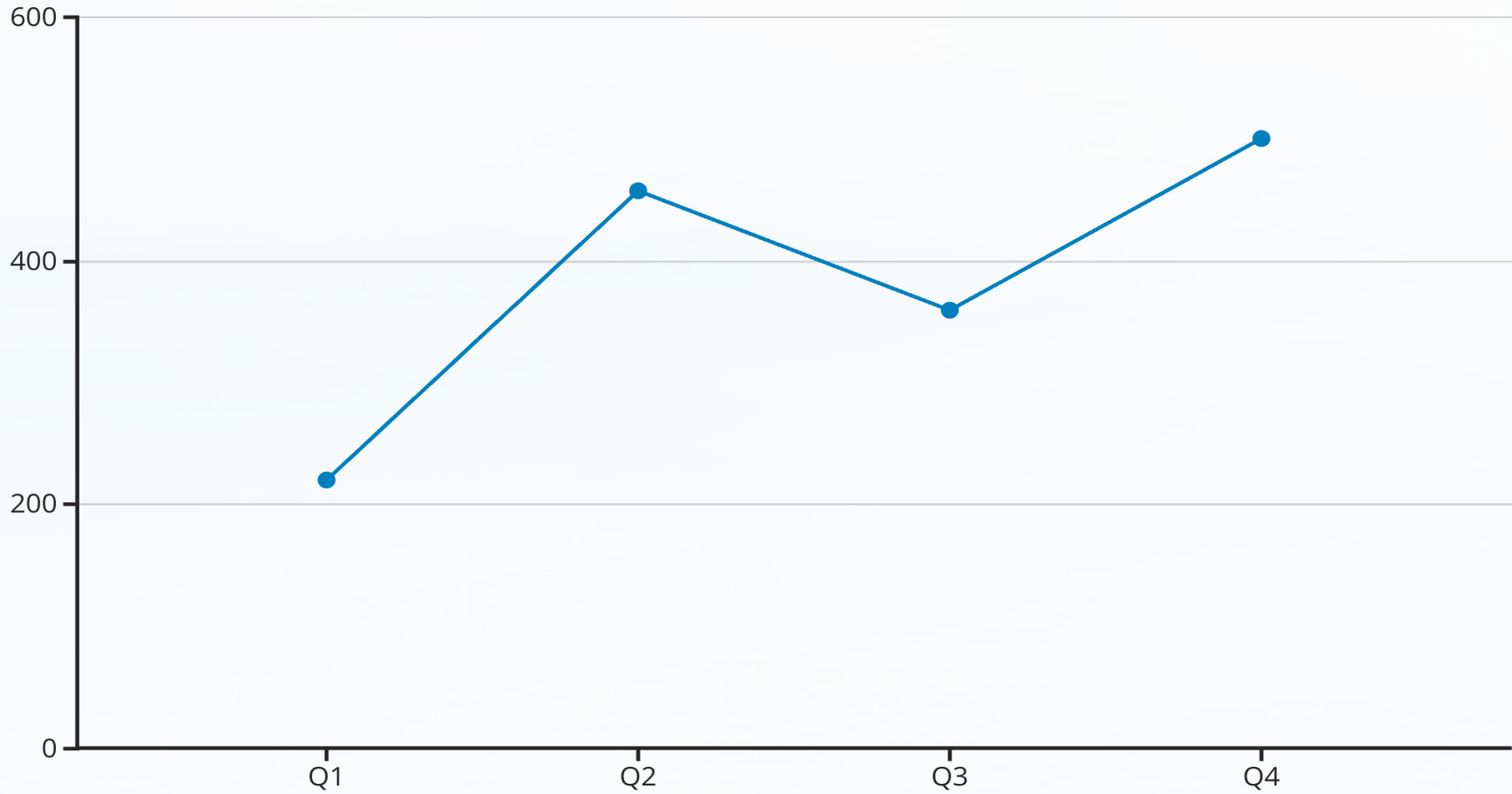


# Key Findings: Salivary pH Changes

**+0.45**  
Sugar-free PH changes  
Mean salivary increased significantly  
The sugar-free group moved towards a healthier ph range  
a minor acidic shift.

**-0.05**  
Conventional PH decrease  
Mean salivary PH showed a slight drop

**6.8-7.2**  
Optimal ph range  
Sugar-free moved towards healthier oral environment



# Conclusion and Future Directions



## Significant Impact

Sugar-free toothpaste positively impacts salivary glucose and pH.



## Clinical Recommendation

Suggest sugar-free toothpaste for T2D patients.



## Future Research

Longer trials, larger cohorts, direct correlation to caries incidence.



## Broader Implications

Potential for improved overall oral and systemic health outcomes.

