C-6-S Levels in PMICF under Orthodontic Forces

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Introduction
Stability assessments of the miniscrew implant were previously based on stability assessments of dental implant. Biochemical assessments were widely used to assess stability of dental implant, but rarely for the miniscrew implant.

Material and Methods
A total of ten orthodontic patients were included in this study. Twenty miniscrew implants (8.0 mm in length with 1.6 mm in diameter, Sin, Brazil) were used as orthodontic anchorage. This experiment consisted of two parts. Part I was five weeks and Part II was ten weeks.

Results
Part I
I. Clinical observations
• Unloaded period (1 week) : All miniscrew implants remained clinically immobile.
• Loaded period (4 weeks) : Two miniscrew implants were mobilled.

II. Chondroitin sulfate epitope (WF6 epitope) levels in PMICF samples
• The median of CS epitope (WF6 epitope) levels during loaded period was significantly greater than that during unloaded period (P < .05)
Part II

I. Clinical observations
- Unloaded period (1 week): All miniscrew implants remained clinically immobile.
- Loaded period (9 weeks): One miniscrew implant was mobilized.

II. Chondroitin sulfate epitope (WF6 epitope) levels in PMICF samples
- No significant difference was found between the medians of CS epitope (WF6 epitope) level during unloaded and loaded period.

Conclusions
- The CS level in peri-dental implant crevicular fluid has been used for monitoring bone resorption and health status of dental implant.(1,2,3)
- In our previous study(4), the CS epitope (WF6 epitope) detected in GCF around canine teeth could be used as biomarker of alveolar bone resorption under orthodontic forces.
- The results of our present study showed that the CS epitope (WF6 epitope) in PMICF both under and without orthodontic loaded could be precisely detected. These findings were coincided with those of Sari and Uçar (5) that IL-1β levels (a peri-miniscrew implant alveolar bone resorption maker) could be precisely detected.
- The ELISA method provides an accurate assessment of CS epitope (WF6 epitope) level with the simplicity of a "chairside" application.
- To draw a reasonable conclusion for using the CS epitope (WF6 epitope) level as a biomarker for assessing alveolar bone remodeling around miniscrew implants, further investigation with an increased sample size is needed.

Literature

This Poster was submitted by Dr. Imjai Intachai.

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**Objective**

This study aimed to detect c6-sulfate (C-6-S) in peri-implant infection mucosal fluid (PMIF) which might be used as a biomarker for osseous bone remodeling under orthodontic forces.

**Materials & Methods**

- A total of ten orthodontic patients were included in this study.
- Twenty miniscule implants (6.0 mm in length with 1.6 mm in diameter) were placed bilaterally on the alveolar bone between the roots of maxillary anterior teeth.
- Histopathologically sections (10 µm) were used to locate the implant site and to show the healing process clearly.
- The study consisted of two parts. Part I: Four weeks period and Part II: Four weeks period.

**Experimental design**

Part I: Clinical observations

- Unloaded period (8 weeks)
  - All miniscule implants remained clinically stable.
  - Two miniscule implants were tested.

- Load period (8 weeks)
  - Three miniscule implants were tested.

**Results**

**Part I**

- Clinical observations
  - Unloaded period (8 weeks)
  - All miniscule implants remained clinically stable.
- C6-S levels in PMIF samples
  - The median of C6-S levels during loaded period was significantly greater than the during unloaded period (P < 0.05).

**Discussion & Conclusion**

- The C6-S level in peri-implant infection mucosal fluid has been used for monitoring bone resorption and health status of dental implants.
- In our previous study, by using an enzyme-linked immunosorbent assay (ELISA) with a newly developed monoclonal antibody (MAB) with C6-S, it could be precisely detected in GMIF during orthodontic force application. This suggested that the levels changes of C6-S might be used as a biomarker for detection of bone resorption during orthodontic treatment.
- The results of our present study showed that the C-6-S in PMIF both under and without orthodontic loading could be precisely detected. Thus, findings were consistent with those of F-Actin and IgG (both C-6-S in peri-implant infection mucosal fluid resorption rate). It could be presumed that C6-S levels in PMIF is a biomarker for osseous bone remodeling under orthodontic forces.
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- To draw a reasonable conclusion for using the C-6-S level in a biomarker for osseous bone remodeling under miniscule implants, further investigation with an increased sample size is needed.