

38th Asia Pacific Dental Congress in香港

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38th
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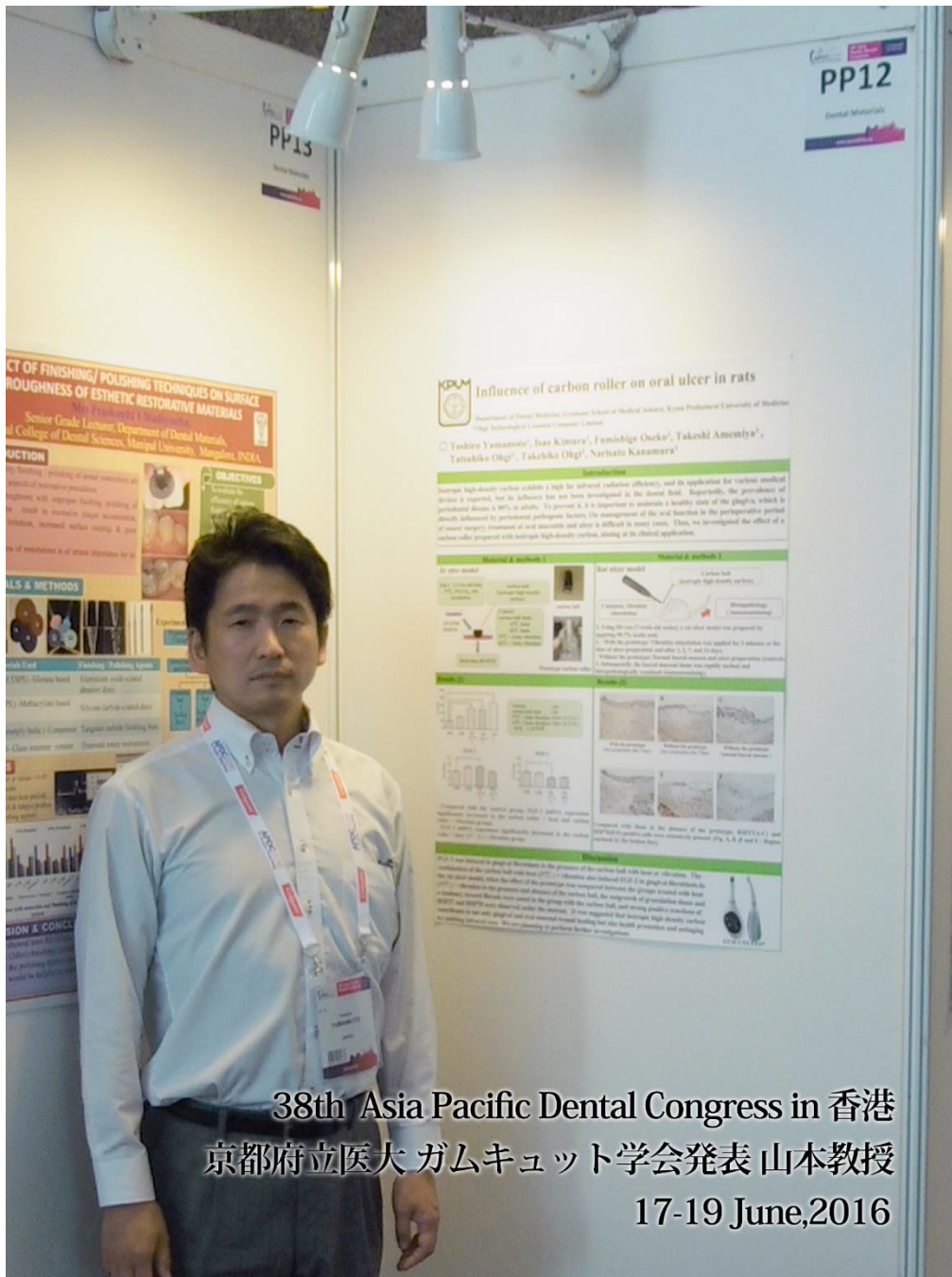
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Influence of carbon roller on oral ulcer in rats

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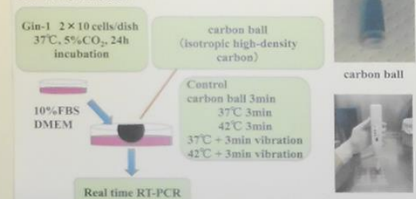
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Introduction

Isotropic high-density carbon exhibits a high far infrared radiation efficiency, and its application for various medical devices is expected, but its influence has not been investigated in the dental field. Reportedly, the prevalence of periodontal disease is 80% in adults. To prevent it, it is important to maintain a healthy state of the gingiva, which is directly influenced by periodontal pathogenic factors. On management of the oral function in the perioperative period of cancer surgery, treatment of oral mucositis and ulcer is difficult in many cases. Thus, we investigated the effect of a carbon roller prepared with isotropic high-density carbon, aiming at its clinical application.

Material & methods 1

In vitro model



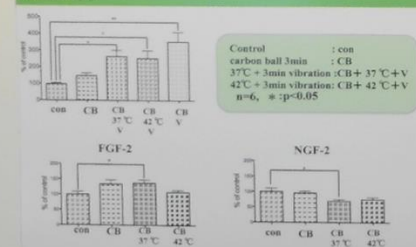
Material & methods 2

Rat ulcer model



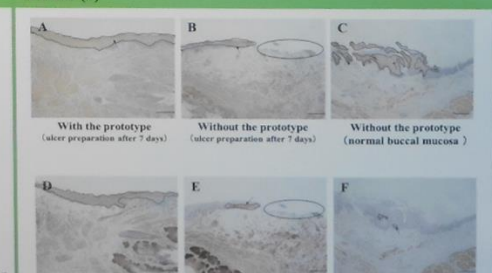
- Using SD rats (7-week-old males), a rat ulcer model was prepared by applying 99.7% acetic acid.
- With the prototype: Vibration stimulation was applied for 3 minutes at the time of ulcer preparation and after 1, 2, 7, and 14 days.
- Without the prototype: Normal buccal mucosa and ulcer preparation (control). Subsequently, the buccal mucosal tissue was rapidly excised and histopathologically examined (immunostaining).

Results (1)



- Compared with the control group, FGF-2 mRNA expression significantly increased in the carbon roller + heat and carbon roller + vibration groups.
- FGF-2 mRNA expression significantly increased in the carbon roller + heat (37°C) + vibration group.

Results (2)



Compared with those in the absence of the prototype, HSP27(A-C) and HSP70(D-F)-positive cells were extensively present. (Fig. A, B, D and E : Region enclosed by the broken line).

Discussion

FGF-2 was induced in gingival fibroblasts in the presence of the carbon ball with heat or vibration. The combination of the carbon ball with heat (37°C) + vibration also induced FGF-2 in gingival fibroblasts. In the rat ulcer model, when the effect of the prototype was compared between the groups treated with heat (37°C) + vibration in the presence and absence of the carbon ball, the outgrowth of granulation tissue and a tendency toward fibrosis were noted in the group with the carbon ball, and strong positive reactions of HSP27 and HSP70 were observed under the mucosa. It was suggested that isotropic high-density carbon contributes to not only gingival and oral mucosal wound healing but also health promotion and antiaging by emitting infrared rays. We are planning to perform further investigations.



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