ROLE OF DENTAL AND GINGIVAL SPLINT IN THE LACTOBACILLUS COUNT OF THE MOUTH*

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ABSTRACT

The increasing effects for oral lactobacilli by the application of dental and gingival splint were observed.

The mean increase ratios of oral lactobacilli estimated on ten subjects by the application of dental and gingival splint for 3 hours were 1.487 ± 0.5267 and 1.273 ± 0.3354, respectively. These values were closely resembling to the spontaneous ratio in the case of no splint application (1.43), and there were no significant differences among them.

These results indicated that the growth of oral lactobacilli could not be stimulated only by the anaerobic condition under dental splint and that the exsudate appeared from mucous membrane under gingival splint could not favor the growth of lactobacilli.

From these observations, it was concluded that the factors flowed out from gingival crevice were the most important growth stimulating agent for lactobacilli under the dentogingival splint used in the experiment of Onishi et al.

Onisi and Kondo[1,2] reported that the deposition of dental calculus could be controlled by the application of dentogingival splint in the oral cavity, owing to the appropriate amount of acid produced by lactic acid bacteria grown under the splint. The splint used in the above experiment was made to cover three portions, that is, the surface of teeth, marginal gingiva and gingival crevice which would have different biological significance.

The purpose of present report was to determine as the most effective procedure which one of three portions should be covered with splint for the increase of lactobacilli in the oral cavity.

MATERIALS AND METHODS

Ten subjects having no carries and clinically no sign of gingivitis were chosen. Dental splint and gingival splint fit to each individual with acrylic

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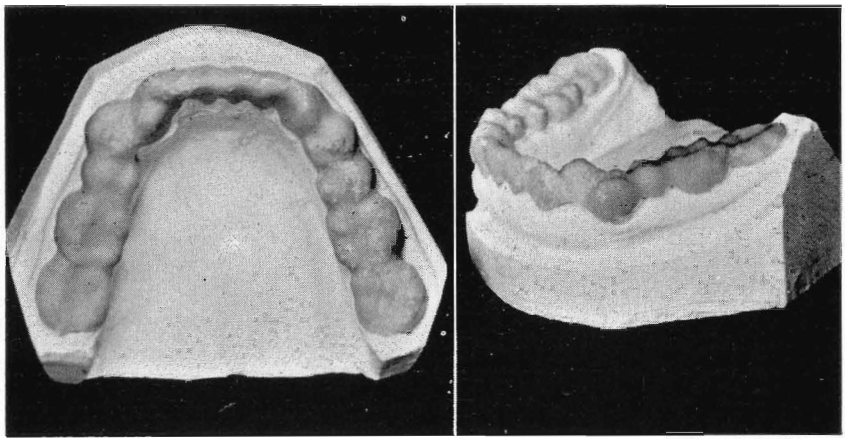
resin (Fig. 1). Dental splint was made to cover the all teeth of lower jaw, and gingival splint to cover the gingiva and part of mucous membrane of buccal and paratinal site of upper jaw. These two splints were made not to cover the opening of the crevices to be washed out the tissue fluid flowed from gingival pocket with saliva and to keep away it from the splint.

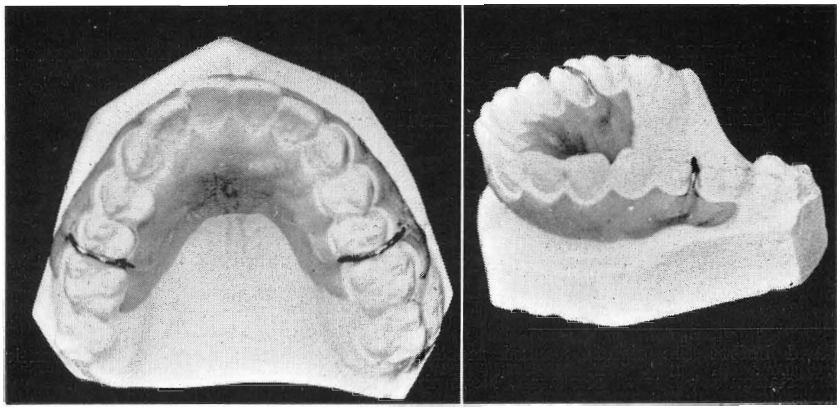
After tooth brushing and gargling of the mouth, the gargling sample was collected with 10 ml of sterile peptone water. Then the splint coated inner side with acetyl cellulose paste was applied in the oral cavity. After three hours, the splint was taken off, and again the gargling sample was collected.

The enumeration of lactobacilli in the gargling samples were carried out according to the method of Onisi et al.[1)]

Fig. 1



B. Dental Splint



A. Gingival Splint

Rate of lactobacillus counts increased after three hours application of the dental and gingival splint.

Subject	Dental splint	Gingival splint
OZ	0.920	1.243
ST	1.323	0.908
HS	1.833	1.348
TM	1.219	1.429
KA	1.142	1.765
SU	1.308	1.316
AL	2.221	
IK	2.552	
OH	1.106	
HY	1.270	
OT		0.952
HG		1.526
TN		0.674
SK		1.569
Average	1.489 ±0.5267	1.273 ±0.3354

$T=1.5450<t_{18}=2.101$, in 5% level

Results

The increase ratio of lactobacilli under each splint was shown in Table, and the ratio of one subject was the mean value of five times estimations.

As is shown in the table, it was 6 subjects that could be estimated with applications of both two splints. The mean increase ratios of oral lactobacilli by application of dental and gingival splint were 1.489±0.5262 and 1.273± 0.3354 respectively. These values were closely resembling to the spontaneous increase ratio in the case of no splint application estimated by Onisi et al.[2], and there were no significant differences among these three mean ratios.

Discussion

As a function of dentogingival splint, two possibilities were considered that the plate would serve to retain the nutrients such as the tissue fluid appeared in gingival pockets and exsudate from mucosa under the plate, and the anaerobic environment formed between the plate and dentogingival surface would favor the growth of oral anaerobes including lactobacilli. The mean increase ratio of oral lactobacilli by application of dental splint was not higher than that of spontaneous increase. From this result it may

be suggested that the growth of oral lactobacilli could not be stimulated by the anaerobic condition alone formed between the dental splint and tooth surface. Furthermore, in the case of gingival splint, it was shown that the exsudate from mucous membrane under the splint did not favor the growth of lactobacilli.

These results indicated that the growth stimulating factors for lactobacilli under the dentogingival splint are supplied from the gingival crevice. Many reports supporting this assumption, before and after this experiment was performed, have been appeared. For example, passage of tissue fluid into gingival pocket was reported by Brill et al.[3,4] Konno[5], Sueda[6], and Hara[7] noticed the amino acids and carbohydrates in the fluid appeared in the gingival pockets. Takamori[8] also reported the growth stimulating factor especially carbohydrates for lactobacilli in the fluid flowed out from the gingival crevice.

In the oral cavity, however, the factors from gingival crevice could not be considered for only nutrients to promote the growth of lactobacilli. Suenobu[9] reported that the number of oral lactobacilli increased in a period of menstruation and gingivitis, and Dewar[10] observed the accumulation of glycogen in various oral tissues in such periods. Moreover, Onisi et al.[11] observed in the new born infants that the oral lactobacilli reached the maximum number in two days after birth. Further, it is widely known that the number of lactobacilli is related to the caries activity. These facts suggest that in the oral cavity the growth promoting factors for lactobacilli other than that of gingival crevice must have in consideration.

However, in the case of application of splint in oral cavity, it can be conceivable that the most stimulating factors for growth of lactobacilli are supplied from gingival crevice, and not from mucous membrane, gingiva, and minor salivary glands.

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