

INFLUENCE OF PROSTHETIC APPLIANCES UPON THE FLOW OF CREVICULAR TISSUE FLUID

Part 2. Crevicular tissue fluid followed up after the insertion of prosthetic appliances

BY

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ABSTRACT

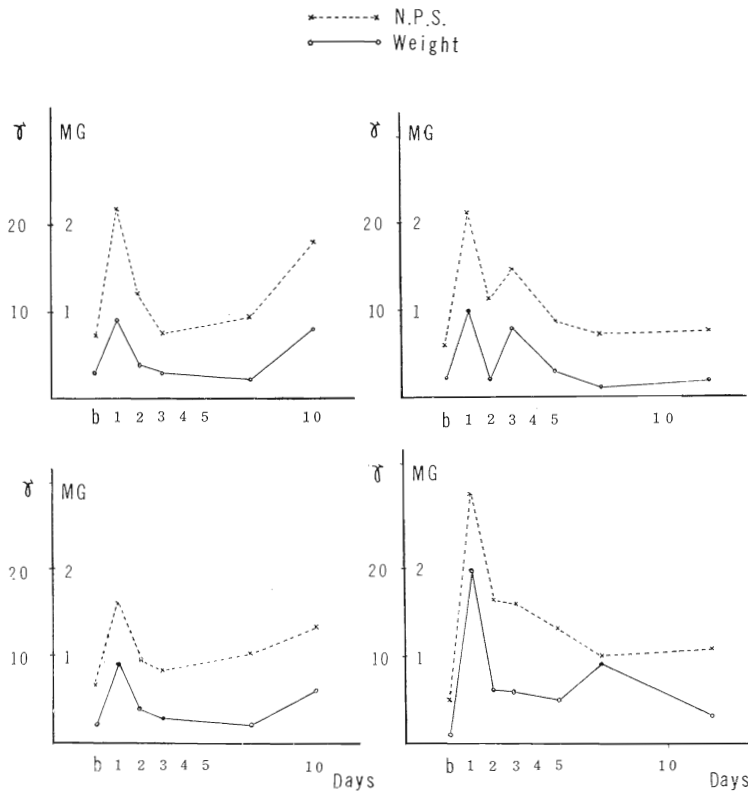
In this study, the crevicular tissue fluid from the gingival sulcus was studied on the weight and the amount of ninhydrin positive substance especially on their change occurring in the earlier stage (1 day, 2 days and 3 days after the insertion) and later stage (3-5 days, 7-10 days, 30 days, 6 months, 1 year and 2 years after the insertion) after the insertion of prosthetic appliances. Twenty-eight teeth surrounded with clinically healthy gingivae were selected and were provided with various kinds of prosthetic appliances (10 post crowns and 6 clasps in the early stage observation group, and 3 post crowns, 3 cast crowns, 3 wire clasps and 3 cast clasps in the later stage observation group). Consequently, it was found that there were two kinds of the influence of prosthetic appliances on the crevicular tissue fluid. One occurs momentarily in the early stage after the insertion and soon disappears within 3-5 days, when prosthetic procedures are properly applied. The other occurs in the later stage after the insertion and may develop to any chronic ill condition of gingivae. The influence in the early stage includes these two types; the increasing and decreasing of the amount of ninhydrin positive substance. The increasing was observed in cases with finely fitted artificial resin post crowns and might be caused by the stress of insertion or the quick change of the contact relation between the crevicular epithelium and the surface of an artificial clinical crown. On the other hand, the decreasing was observed in cases with clasps and might be due to the defence mechanism of crevicular tissue. The influence in the later stage was found in cases with finely fitted resin facing post crowns, and was assumed to be effected by the resin used and by the subsequent deposit to it.

INTRODUCTION

It was already reported in the previous paper (Part 1)¹⁾ that the crevicular tissue fluid was influenced by some of the prosthetic appliances. This is likely probable because the recent progress of prosthodontics has made it possible to construct the prosthetic appliances of a high standard mechanically and esthetically. However, the minor mechanical stimulation

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involved in the preparation of prosthetic appliances can be effective to cause some disturbance of the biological condition in the adjacent gingival tissue.

This paper is planned to study and find the finer change of crevicular tissue fluid which may probably occur in the earlier stage of post-insertion period of prosthetic appliances.

MATERIALS AND METHOD

The material was collected from the clinically healthy gingival sulci of the out-patients who visited the dental hospital of Tokyo Medical and Dental University, and who were inserted the following prosthesis:

1. Early stage observation group
 - 1) Post crowns (10 cases)
 - 2) Clasps of removable partial dentures (6 cases)
2. Later stage observation group

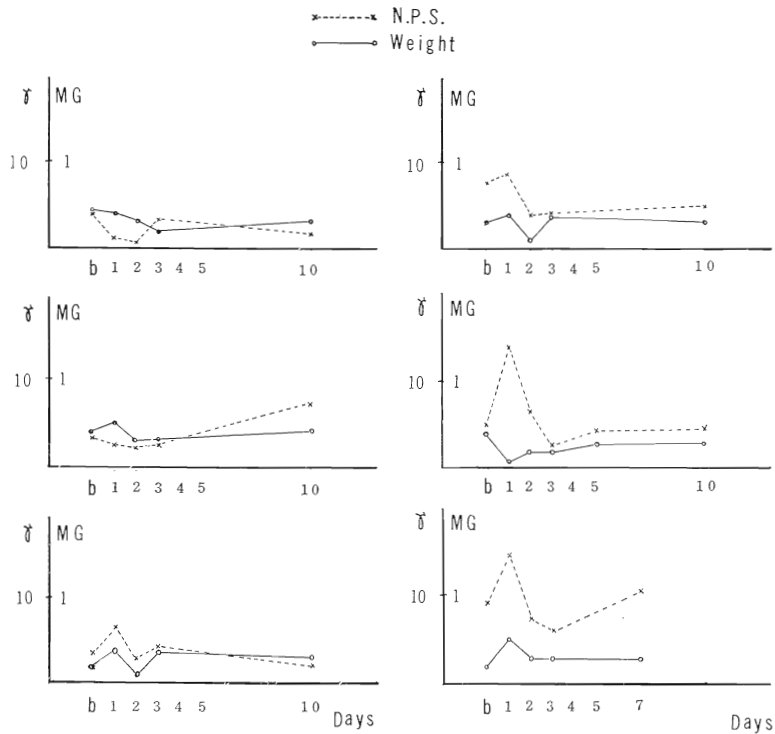


Fig. 2. Finely fitted post crowns with resin facings

Fig. 1 and 2: The step-progress of the crevicular fluid weight (solid line) and the amount of ninhydrin positive substance in this fluid (dash line) in the early stage after the insertion of resin facing post crowns

- 1) Full cast crowns (3 cases)
- 2) Post crowns (3 cases)
- 3) Artificial dentures with cast clasps (3 cases)
- 4) Artificial dentures with wire clasps (3 cases)

Methods applied were already described in the previous report, except on the observation step. The crevicular tissue fluid in the group of early stage observation was collected just before preparation and at each step immediately after the insertion, namely, at 1 day, 2 days, 3 days and further. And, in the group followed up for long time, the fluid was collected in each stage; before preparation, at 3-5 days, 7-10 days, 30 days, 6 months, 1 year and 2 years after the insertion.

RESULTS

1. The step-progress of crevicular tissue fluid before preparation and

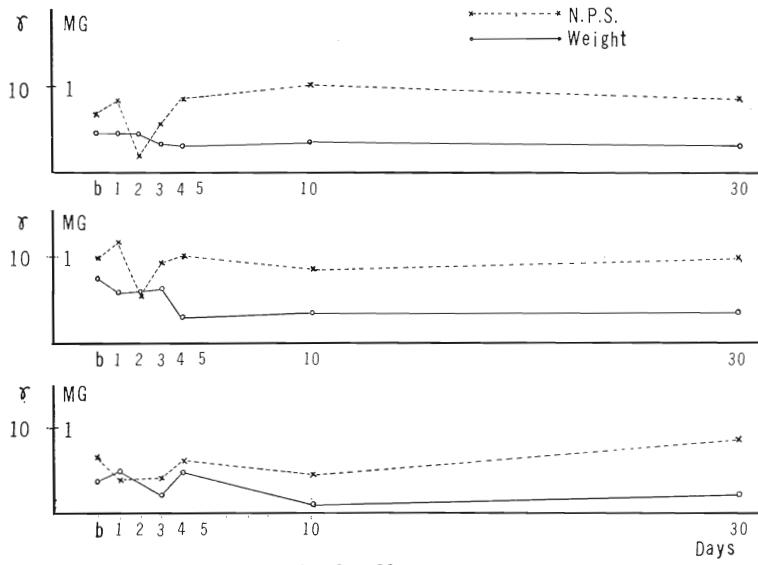


Fig. 3. Clasp cases

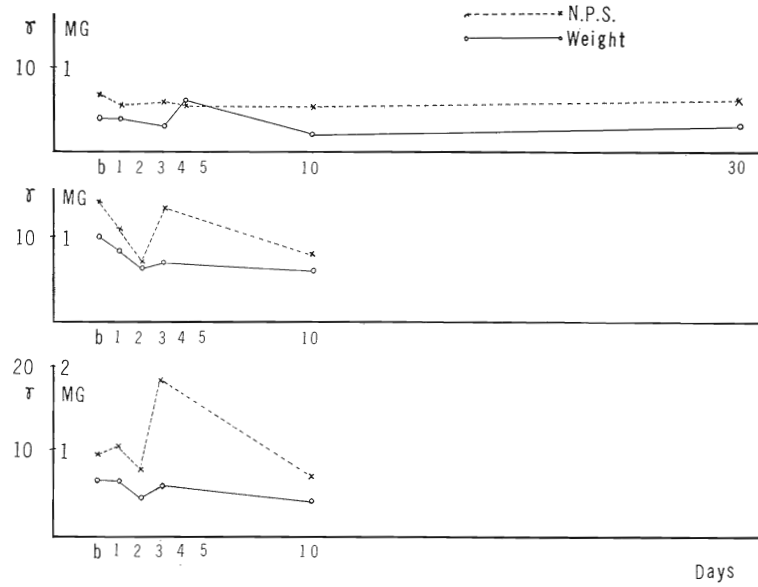


Fig. 4. Clasp cases

Fig. 3 and 4: The step-progress of the crevicular fluid weight (solid line) and the amount of ninhydrin positive substance in this fluid (dash line) in the early stage after the insertion of clasps

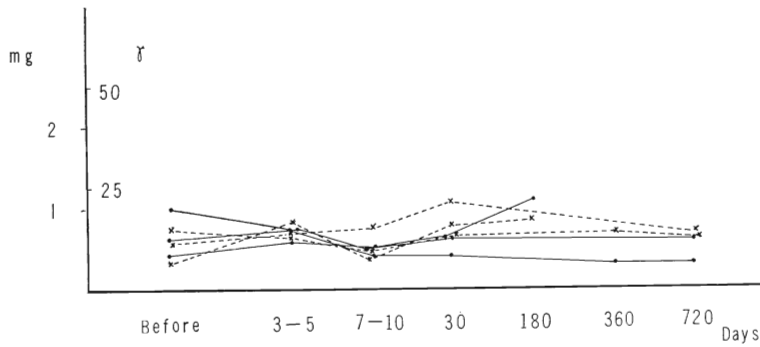


Fig. 5. Finely fitted cast crown cases

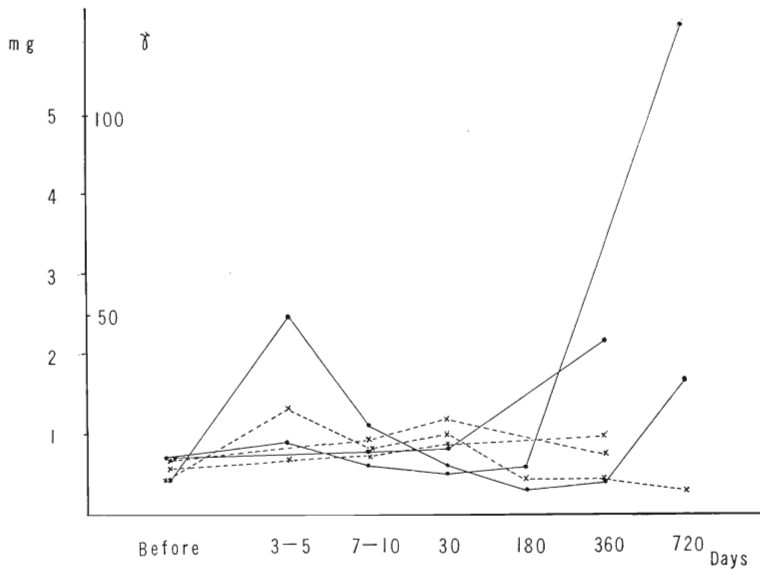


Fig. 6. Finely fitted post crowns with resin facings

in the early stage after cementing of resin facing post crowns were shown in Figs. 1 and 2. The crevicular tissue fluid weight and the amount of ninhydrin positive substance increased significantly, at 5% significant level, at 1 day after cementing. The early increment of fluid both in the fluid weight and the amount of ninhydrin positive substance turned reversely to decrease next day or within 3-5 days, then became to have no significant difference as that found before preparation.

2. In cases with clasps, the step-progress of crevicular fluid was indicated

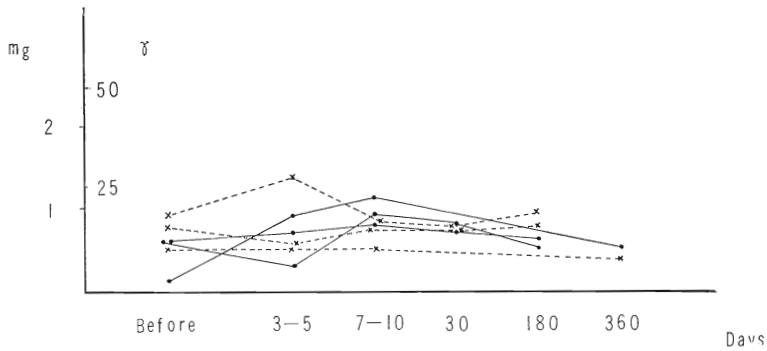


Fig. 7. Cast clasp cases

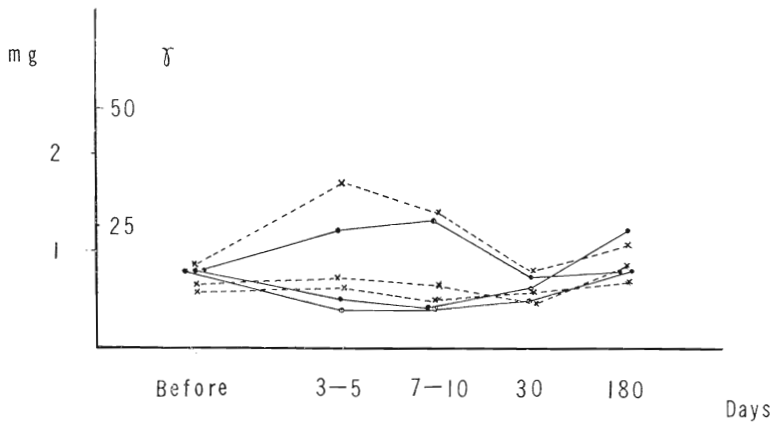


Fig. 8. Wire clasp cases

Fig. 5-8: The step-progress of the crevicular fluid (solid line) and the amount of ninhydrin positive substance in this fluid (dash line) in long term observation group

in Figs. 3 and 4. The fluid showed no remarkable change in the fluid weight in this early stage observation, but showed a significant decrease in the amount of ninhydrin positive substance at 2 days after the insertion. This decrement of the amount of ninhydrin positive substance again disappeared at 3-5 days after the insertion.

3. In the group followed up for long time, only 3 cases for each kind of prosthetic appliances were studied and could be found no change in both the fluid weight and the amount of ninhydrin positive substance at 6 months and 12 months after their insertion (Figs. 5, 7 and 8).

In post crown cases, the result of step-progress of gingival fluid was shown in Fig. 6. The fluid weight showed a tendency to increase with the lapse of time after the insertion and indicated the correspondent higher

values at 1 year and 2 years after the insertion. However, the amount of ninhydrin positive substance at 1 year and 2 years after the insertion was almost the same as that measured at 30 days after the insertion.

DISCUSSION

The previous report (Part 1) first revealed that the flow of this fluid changed after the insertion of some kind of prosthetic appliances; 1. In cases with ill fitted crowns, the flow of this fluid was more than those in clinically healthy gingivae. 2. In cases of post crowns with resin facings, the crevicular tissue fluid increased at 30 days after the insertion even when those were finely fitted. 3. The correlation coefficient between the fluid weight and the amount of ninhydrin positive substance was noted to be definitely decreased in the early stage after the insertion of all cases of prosthetic appliances (at 3-5 days after the insertion) throughout the whole study of their correlation coefficients.

Judging from the data of this study and the previous report, it is ascertained that the crevicular tissue fluid flow changes itself two times in the increment of both the fluid weight and the amount of ninhydrin positive substance after the insertion of post crowns; the first change occurs at 1 day after cementing and the second change does at 30 days after cementing. The difference of these two changes of crevicular fluid flow is in whether it continues or not, because the former disappeared within 3-5 days after insertion and the latter gradually developed with the lapse of time. This may be driven from the difference of their relating cause. The factors for the first change are guessed to be the remaining influence of mechanical injury to marginal gingivae while preparation, the effect of materials used for gingiva contraction and for cementing, and the stress exerted by newly inserted artificial crowns. However, the effect of cements and the materials used for gingiva contraction are not considered to be the main factors because of their early appearance and quick cease. If they were the main factors, this change would have to last for longer time. Therefore, the reasonable factor acting in this first change is supposed to be the stress by newly inserted artificial crowns or the tissue response of crevicular epithelium against the appliances. The factors for the second change were already discussed in the previous report and acrylic resin was pointed out as a main factor. The bacteriological or toxic effect caused by the deposit adhered to the surface of acrylic resin may not so easily disappear but is supposed to develop its effect to bring a kind of chronic inflammation in the gingival tissue.

In cases with cast crowns, the change of crevicular fluid was not found only at 30 days after insertion (Part 1) but also at 1-2 years after their

cementing.

The different modes of the influences or behavior upon the crevicular tissue between cast crowns and post crowns, even when they were finely fitted to the abutment, are reaffirmed here to be due to the resin used for the latter.

The influence of clasps upon the crevicular tissue fluid could not be observed even at 30 days after the insertion, in the previous report. The change of fluid weight was not found also in this study, at 6 months or at 1 year after the insertion. However, the significant decrease, not increase, of the amount of ninhydrin positive substance could be noted at 2 days, disappeared at 3-5 days after the insertion and not found hereafter. This decrease of the amount of ninhydrin positive substance might be considered that the ninhydrin positive substance was taken up into the periodontal tissue as a defence mechanism of the tissue against the traumatic load upon the anchor tooth through the clasp.

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