

## Gingival health of premolar successors to crowned primary molars

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### Abstract

*The gingival health of 97 premolars whose primary predecessors had been restored by preformed crowns was assessed clinically. No statistically significant differences were observed between the gingival index of the test teeth and controls.*

Clinical evidence has shown that primary teeth that cannot properly be restored with amalgam can be retained until normal exfoliation when a preformed stainless steel crown is made.<sup>1-4</sup> Despite widespread use, the effect of stainless steel crowns on gingival health is still controversial. While some investigators believe that no adverse effect on the gingiva can be noticed if the crowns are properly adapted, others claim that there is an increase in gingival irritation associated with stainless steel crowns.<sup>5-9</sup> Parffit suggested that periodontal disease is a slow process, the early stages of which may start with puberty.<sup>10</sup> If gingivitis is a frequent finding around primary teeth restored with preformed crowns, the question arises as to whether this is a temporary condition that disappears with exfoliation of the primary tooth or whether the gingival health around the permanent successor is affected. If the gingiva of the permanent successors of crowned primary teeth do not differ from the gingival health of the rest of the mouth, the question of whether or not preformed crowns per se result in gingivitis around primary teeth becomes a matter of lesser importance. If the opposite is true, then the pedodontist will have to pay much greater attention to, and investigate details of crown fabrication and adaptation affecting the gingivae. The purpose of the present investigation was to examine the gingival health of premolars whose primary predecessors have been restored by preformed crowns.

### Methods and Materials

Fifty children participated in this study. Each had a history of at least one primary molar restored by a preformed stainless steel crown,<sup>a</sup> and whose succeda-

neous premolar had erupted to full occlusion. This last requisite was imposed to eliminate possible error by assessing gingival inflammation at the eruptive stage.<sup>10,11</sup>

The preparation and fabrication of the crowns on the primary teeth were done following an accepted technique several years before, by students at the Department of Pedodontics of the Hadassah Faculty of Dental Medicine. All crowns had been in the mouth for at least one year before exfoliation. Cases in which the primary predecessor had been extracted due to pulpal and/or periodontal complications were not included in the sample. A total of 97 premolars met the above requirements.

The children were examined at the clinic by a single examiner. The examination was blind; the examiner did not know which teeth were the ones whose predecessors had been crowned. The gingival health of all teeth was assessed utilizing the gingival index (GI).<sup>12</sup> The examiner had thorough training in use of the gingival index. To test the reproducibility of the readings, eight of the children were reintroduced for examination using new charts without the examiner's knowledge. He attained a high degree of reproducibility.

### The Examination

The assessment of gingival inflammation was done according to the gingival index criteria of Löe and Silness.<sup>13</sup> In the present study the gingival index (GI) of the tested premolar was compared to:

1. The GI score of the homologous premolar (GIH)—67 cases
2. The GI of Löe and Silness using representative teeth  $\frac{62}{4} \mid \frac{4}{26}$  (GIR)—47 cases (if one of the representative premolars was a test tooth, the representative teeth were switched to  $\frac{4}{62} \mid \frac{26}{4}$ )
3. The GI of the complete mouth other than the test teeth (GIC)—all 97 cases.

The three comparisons could not be done in all cases because of such situations as: crowns on the predecessor of the contralateral tooth or its incomplete

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eruption, more than one test tooth being one of the selected representative teeth of Løe and Silness, or crowns on the predecessors of these representative teeth.

## Results

The mean of the gingival indices values of the tested teeth (GIT), their homologues (GIH), the representative teeth (Løe and Silness) (GIR) and of the complete mouth (GIC) is presented in Table 1. No statistically significant differences were observed at a 0.05 level, when examined by the paired t-test.<sup>14</sup> The McNemar and Wilcoxon tests also showed that there were no differences between the GI of the test teeth and of the control groups.<sup>14</sup>

The reproducibility of the readings of the examiner was tested in eight children by the linear correlation coefficient (R). A high reproducibility was found (R = 0.8222).

## Discussion

Comparing gingival health around a tooth on one side of the mouth with its homologue has the drawback of possible differences in chewing and cleaning habits. To further check the findings, the gingival health around the test teeth was compared, wherever possible, to that of the GI index of Løe and Silness and to the GI index of all the other teeth.<sup>12,13</sup>

The differences of opinion on the association of gingivitis to the use of preformed crowns in primary teeth may be related to the method of study. Two reports stating that these crowns do not cause gingivitis were prospective studies, in a limited number of children and in which minute care was taken in the preparation and adaptation of the crowns.<sup>5,6</sup> Two other studies reporting association of gingivitis with preformed crowns were retrospective.<sup>8,9</sup> Myers found that the frequency of gingivitis was related to the accuracy of the crown fabrication, contour, and cementation. Even when the crowns were considered to be satisfactory, inflammation was evident in 24% of the cases. Where the crowns were classified as unsatisfactory, 89% had gingivitis.<sup>8</sup> The present study was retrospective, the crowns having been adapted by junior and senior students. Extrapolating from findings of Myers, at least 65% of the crowned primary precursors would have had gingivitis. The gingival health around the permanent successors of crowned primary molars in this study was no different from that of the rest of the mouth. This would suggest that even if gingivitis was present around the crowned primary teeth it was resolved with exfoliation and subsequent eruption of the permanent teeth; this could not be considered as

**Table 1.** Comparison of the Gingival Indices of the Test Teeth and the Control Groups

	Number of cases	Mean	Standard deviation
GIT	97	0.69	0.295
GIH	67	0.64	0.299
GIR	47	0.63	0.195
GIC	97	0.64	0.176

GIT = Gingival index of the test tooth.

GIH = Gingival index of the homologue tooth.

GIR = Løe and Silness gingival index.

GIC = Gingival index of complete mouth excluding test teeth.

potential foundation of periodontal disease in adults. This conclusion should not be misinterpreted as a justification for ill-fitting and poorly contoured preformed crowns. This study was done on children treated in a student clinic, where a high degree of contour and adaptation of the crowns was demanded.

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