White spot lesions with aligners versus braces

BACKGROUND

White spot lesions (WSLs) develop during orthodontic treatment in about a fourth of the patients. Some improve after treatment and some can be improved with treatment, but permanent scars can linger and require restorative measures. Among the factors that increase the risk of WSLs are treatment time exceeding 36 months, poor pretreatment hygiene, hygiene changes during treatment, and preexisting WSLs. Fixed orthodontic appliances promote bacterial plaque accumulation and limit the ability to properly clean the teeth, leading to WSLs. The results of treatment with removable aligners might be expected to reduce WSL formation.

METHODS

The 450 participants represented consecutive cases in late mixed or permanent dentitions who had high-quality pretreatment and posttreatment digital photographs available. They included 244 patients treated with aligners and 206 patients treated with traditional fixed braces. Two investigators independently evaluated the photographs to determine pretreatment oral hygiene (OH) and the presence of fluorosis and WSLs, as well as changes in OH and WSLs during treatment.

RESULTS

No significant differences were present between the pretreatment age or the gender of the 2 groups. However, the duration of treatment for the traditional group was significantly greater than that for the aligner group. The 2 groups also differed significantly in pretreatment fluorosis, with 2.0% of the aligner group and 8.7% of the traditional group having fluorosis. They did not differ in the presence of pretreatment WSLs.

Differences in pretreatment OH were also present, with those in the traditional group having slightly more (5.7%) with poor OH and 6.6% more with good OH, but fewer (12.3%) with fair OH. In the aligner group 3.3% more patients improved and 9.4% fewer worsened. Changes in OH during treatment and treatment duration showed no relationship.

When specific maxillary teeth were considered, WSL incidence was slightly higher for maxillary canines than for maxillary laterals and was lowest for maxillary central incisors. Among mandibular teeth WSLs were most common in the canines, then the lateral incisors and central incisors. Maxillary teeth were more likely to develop WSLs than mandibular teeth regardless of treatment. Patients with aligner therapy had WSLs on 0.8% and 0.4% of their maxillary and mandibular teeth, respectively. Traditionally treated patients developed lesions on 18.9% of their maxillary and 15.3% of their mandibular teeth.

In the overall analysis, fewer aligner patients developed WSLs than traditional patients, with the percentages being 1.2% for the aligner patients and 25.7% for the traditionally treated patients. Among the patients treated in the university setting, 3.2% of the aligner patients and 29.2% of the traditional patients developed WSLs. Among the patients treated in a private practice setting, 0.9% of the aligner patients and 22% of the traditional patients developed WSLs.

The risk factors found in patients undergoing traditional treatment included pretreatment OH and changes in OH during treatment. Patients with preexisting WSLs were also significantly more likely to develop WSLs during treatment. Patients treated for more than 2 years were 1.6 times more likely to develop WSLs than those treated for less than 2 years.

DISCUSSION

A substantial risk for developing WSLs was found among patients who were managed with traditional orthodontic braces. About 26% of these patients, or 1 in 4, was at risk for WSL development. Braces might be expected to increase the risk of developing WSLs because of their association with increased salivary bacterial counts, greater plaque accumulation, and difficulty cleaning teeth effectively.

Clinical Significance

Patients who undergo aligner treatment are at a reduced risk for developing WSLs compared to those who are managed using traditional orthodontic braces. It's likely that the ability to remove the aligners and to remove plaque and perform better OH likely is related to the reduction in risk compared to persons wearing braces.

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Reprints available from PH Buschang, Dept of Orthodontics, Texas A&M Univ College of Dentistry, Dallas, TX 75246; e-mail: PHBuschang@tamhsc.edu