



# Acrylic orthodontic retainer is not a risk factor for focal *Candida* colonization in young healthy patients: a pilot study

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**Background.** Denture enhances the risk of *Candida* colonization because of adherence to acrylic base and interference with salivary rinsing. Acrylic orthodontic appliances may also create retentive areas for food debris and microbial pathogens; moreover, patients are instructed to use the retainers at night, when salivary secretion is reduced. We studied the *Candida* colonization in orthodontic patients using acrylic retainer.

**Methods.** Participants were orthodontic patients with full compliance during the retention phase with no signs or symptoms or being at risk for *Candida*, divided into users of (a) Hawley retainer (study group) and (b) other retainers (vacuum-formed/fixed bonded retainer; control group). Collected data included demographic characteristics and habits. Samples were collected from palate mucosa, cultured and incubated (28°C) for 3 days. Positive *Candida* species were recultured to identify the *Candida* species.

**Results.** Fifty-one patients participated (mean age 20.9 ± 9.6 years); 22 had maxillary Hawley retainer and 29 had maxillary vacuum-formed/fixed bonded retainer. *Candida albicans* colonization in the hard palate was identified in 2 patients (3.9%)—1 (4.5%) from the Hawley retainer study group and 1 (3.4%) from the control group.

**Conclusions.** The hypothesis that palatal coverage by acrylic orthodontic retainer might enhance *Candida* colonization on the palatal mucosa is not supported by this pilot study. (Oral Surg Oral Med Oral Pathol Oral Radiol 2016;121:39-42)

The goal of the last phase of orthodontic treatment, the retention phase, is to stabilize the occlusal relations and teeth positions achieved in the active phase of treatment. Different appliances are used as retainers, including removable retainers (e.g., Hawley, vacuum formed, and positioner), and bonded fixed orthodontic retainers (Figure 1). Each retainer has several advantages and disadvantages. The bonded retainer is not dependent on patient compliance and does not cover the soft tissue but may be at risk for breakage and demands careful cleaning; this type of retainer is associated with an increased risk of gingival recession, bacterial plaque retention, and signs of gingival inflammation.<sup>1</sup> Hawley retainer is fabricated from acrylic resin and covers most of the palatal soft tissue. As with any removable appliance, the Hawley

retainer can be selectively used, removed before oral hygiene procedures, and cleaned comfortably outside the mouth. Vacuum-formed retainers cover only the teeth, sometimes slightly touching the adjacent soft tissue.

*Candida*, a yeastlike fungus, is a common colonizer in the oral cavity (and gastrointestinal tract).<sup>2-4</sup> Between one third to two thirds of the general population are carriers of *Candida* in the oral flora, with higher prevalence in older individuals, especially those who use dentures.<sup>5</sup> Among 80 healthy Thai adolescents a prevalence of 32.5% was reported.<sup>6</sup> The dorsum of tongue is the most densely colonized region, followed by palate and buccal mucosae.<sup>7,8</sup> *Candida* colonization rate is influenced by both systemic (such as nutritional status, illnesses, immunodeficiency, and medications) and local factors (such as denture wearing, smoking, hyposalivation, and oral piercing).<sup>4,8-12</sup> Denture wearing enhances the risk of *Candida* colonization (and infection) because of the adherence of the *Candida* to the acrylic base and the interference with salivary rinsing of the covered mucosa.<sup>13</sup> Among denture

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## Statement of Clinical Relevance

Clinicians can prescribe their young and healthy patients an acrylic orthodontic retainer with little risk for focal *Candida* colonization. However, the clinician should consider taking a swab for culture in patients who are at high risk for *Candida* infection.

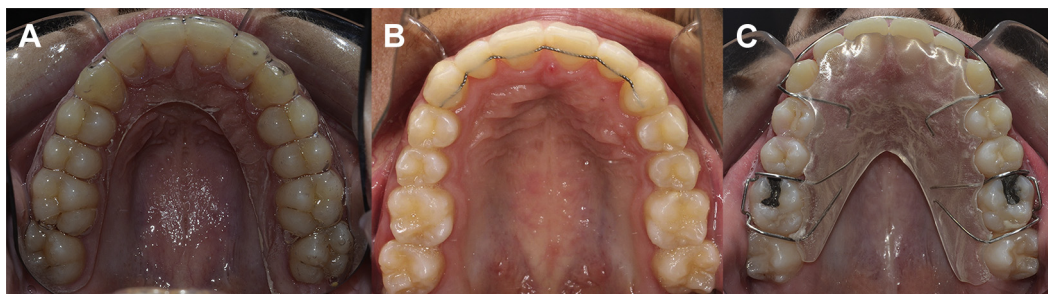


Fig. 1. Maxillary arch retainers. (A) Hawley; (B) vacuum formed; and (C) positioner.

wearers, the prevalence of denture stomatitis (i.e., *Candida*-related lesion under the denture) has been reported variously from 11% to 67%.<sup>8</sup> During the active phase of orthodontic treatment, in which the patient should use the orthodontic appliance 24 hours a day and remove the removable appliance only for eating and brushing, fixed and removable active orthodontic appliances were found to be a risk factor for *Candida* colonization and infection, affecting 25%-40% of the patients with no difference between different kinds of appliances.<sup>14-18</sup> To the authors' best knowledge the prevalence of focal *Candida* colonization during orthodontic retention phase of treatment, in which the acrylic appliance should be used during sleeping hours every night (in which salivary secretion is reduced), was not reported yet. The purpose of the present a pilot research was to study the rate of *Candida* colonization in orthodontic patients using Hawley acrylic retainers.

## MATERIALS AND METHODS

### Study population

The participants in the study were 51 orthodontic patients, treated by the same experienced orthodontic specialist (M.Y.), and were in the retention phase of treatment during the study period (December 2013 to September 2014). Inclusion criteria included the full compliance to wearing of orthodontic maxillary retainer (Hawley, vacuum-formed or bonded fixed retainers). Exclusion criteria included having complaint of related symptoms (e.g., pain or discomfort in the tongue); having lip and/or intraoral piercing; using intraoral acrylic removal prosthodontic; having diabetes mellitus or other medically condition in which *Candida* is prevalent (except of smoking); using hyposalivation-induced medications, antibiotics, glucocorticoids (by oral administration, inhalation, or oral topical agents), or other immunosuppressive agents within 6 months before examination; history of head and neck irradiation and/or anticancer cytotoxic chemotherapy; or self-reporting of HIV infection in the review of systems.

The participants were asked to answer a questionnaire that included data regarding age, gender, smoking, oral hygiene practice, and retainer cleansing method.

### Clinical examination

Palatal soft tissue was evaluated and classified as (a) healthy appearance (i.e., light pink color, no swelling, no pseudomembranous lesions) or (b) affected mucosa (i.e., red color and/or pseudomembranous lesions).

Samples were collected from the palate mucosa of each participant using a swab with Amies gel (Copan, CA, USA); all the clinical examinations and samples collections were performed by the same experienced clinician.

### Laboratory methods

The samples were transported to the laboratory (which was located in the adjacent building in the medical center campus), and there they were immediately cultured by professional laboratory technicians using dermatophyte test medium/Sabouraud's dextrose agar (DTM/SDA) divided dishes (HyLabs, Rehovot, Israel) and incubated at 28°C for 3 days. Cultures were examined macroscopically and microscopically by an experienced microbiologist, who was not aware to the patients' grouping at the time of examination. Positive *Candida* species were recultured on CHROMagar *Candida* plates (HyLabs, Rehovot, Israel) to identify the *Candida* species.

### Statistical analysis

For statistical analysis, participants were divided to 2 groups: (a) users of Hawley retainer (the study group) and (b) users of other retainers (i.e., vacuum-formed or fixed bonded retainer; the control group). Prevalence of palatal *Candida* colonization in study versus control group was tested using the  $\chi^2$  test. Data were recorded into a Microsoft Excel database (Microsoft Corp., Redmond, WA, USA) and analyzed using SPSS Version 21.0 software (IBM Corp., Armonk, NY, USA) statistical software. Two-sided  $P < .05$  was considered statistically significant.

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