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Clinical case

Orthodontic Treatment in Patients with Stable Reduced Periodontium

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ABSTRACT

Introduction: Orthodontic treatment is no longer a contraindication in adult patients with reduced periodontium; it can even improve the chances of saving and restoring a damaged dentition. **Objective:** To present a clinical case of orthodontic treatment in a patient with stable reduced periodontium. **Case presentation:** Patient with stable reduced periodontium who attended the dental clinic of the Universidad Latinoamericana, Valle Campus, to receive periodontal and orthodontic treatment. Scaling and root planing were performed, as well as plaque control in the Department of Periodontics. Once discharged, she was referred to the Orthodontic Department to improve the position of her teeth and her periodontal health. Premolar extractions were performed and fixed appliances were placed. Alignment and leveling of the case, closing of spaces, and finishing and detailing of the occlusion were performed. **Conclusion:** Orthodontic treatment

in patients with stable reduced periodontium is limited and complex and must be evaluated by a multidisciplinary team to achieve defined objectives for realistic results.

Keywords: orthodontics, stable reduced periodontium, periodontal health.

INTRODUCTION

Periodontal disease is nowadays one of the most common dental diseases in the adult population. The seminar for the new classification scheme for periodontal diseases and conditions[1] characterized periodontal health and gingival inflammation in a reduced periodontium after the successful completion of treatment of a patient with periodontitis. The patient, with reduced periodontium, presented a series of typical anomalies such as proclination of upper anterior teeth, diastema, spacing, rotations, and extrusions that could aggravate the periodontal situation in the long term and worsen the patient's esthetics and dental function. One of the solutions to this problem is orthodontic treatment[2,3].

It should be clarified that despite periodontal compromise it has been demonstrated that orthodontic treatment is no longer a contraindication in adult patients with reduced periodontium and that it can even improve the possibilities of saving and restoring the deteriorated dentition; the only contraindication for orthodontic treatment in patients with reduced periodontium is the persistence of active disease[2,3]. In this regard, several studies have shown that in dentitions with reduced periodontium, orthodontic forces and tooth movement do not cause damage to periodontal tissues if good oral hygiene is maintained, but in the presence of inflammation with similar forces they cause more rapid destruction of periodontal tissues[4,5]. Therefore, the following clinical case aims to provide knowledge on the treatment and management of patients with stable reduced periodontium in orthodontics.

CLINICAL CASE PRESENTATION

A 28-year-old female patient, apparently healthy, was referred to the Department of Orthodontics of the School of Dentistry of the Universidad Latinoamericana, Valle Campus by the Department of Periodontics, where she underwent conventional treatment for stage II periodontitis, which included scaling and root planing and plaque control. At the time of her referral to the Orthodontics Department, the patient was in clinical gingival health with reduced periodontium, and as a reason for interconsultation, it was established to improve the conditions of the dentition to help her maintain the health of the periodontium.

Facial analysis revealed a dolichofacial patient with an enlarged lower third, reduced exposure of the upper anterior teeth when smiling, and a straight profile (Figure 1). Clinical examination identified permanent dentition with the absence of teeth 34 and 44, stable reduced periodontium, well-irrigated mucosa, well-implanted frenums, non-coincident midlines, severe upper and moderate lower crowding, teeth 13 and 23 in supra occlusion, Molar Class III, and unilateral crossbite (Figure 2). Diagnostic aids were requested, including orthopantomography and lateral skull radiography (Figure 3).

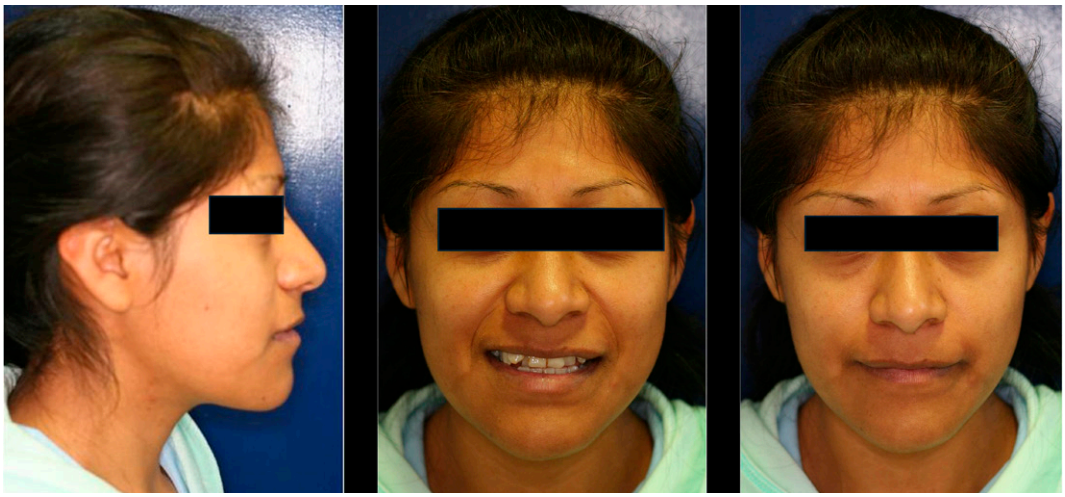

Figure 1. Initial extraoral photographs.

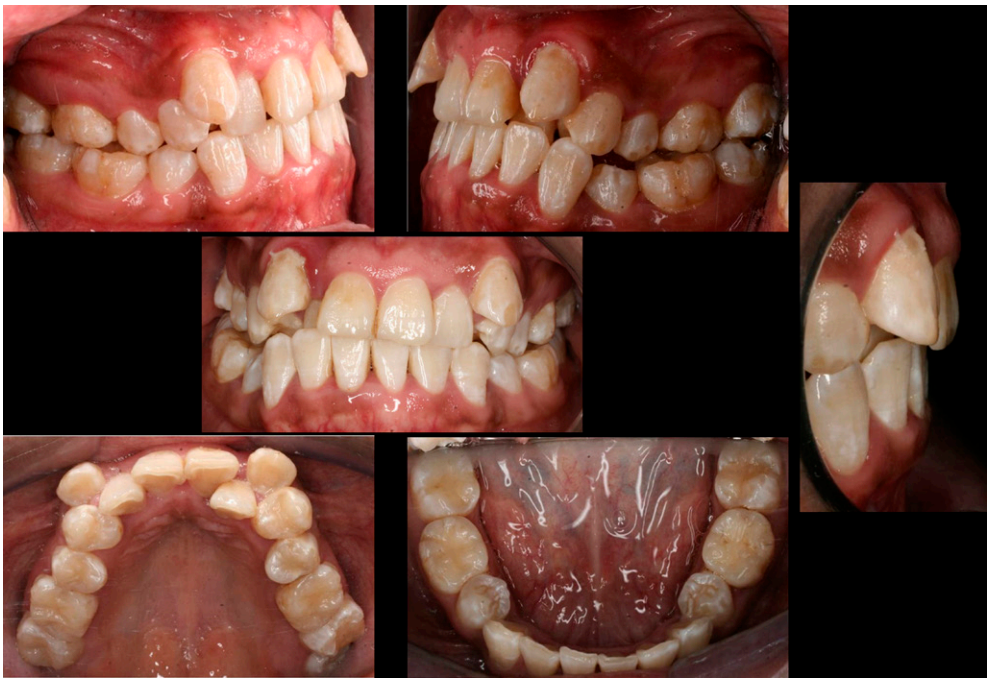

Figure 2. Initial intraoral photographs.

Orthopantomography showed 30 teeth; 28 of them erupted, impacted lower third molars, confirmed absence of teeth 34 and 44, and extensive restorations in 15 and 25. The patient presented dilaceration and decreased root length in teeth 12 and 22. Cephalometric analysis revealed a skeletal Class I with vertical excess of the maxilla and horizontal growth (Table 1).

Based on the analyses presented above, the diagnosis was a skeletal Class I patient with vertical excess of the maxilla, horizontal growth, right molar Class III and left molar Class II, mesialization after extraction of lower first premolars, and unilateral anterior and posterior crossbite; severe negative tooth size discrepancy in the upper arch and moderate in the lower

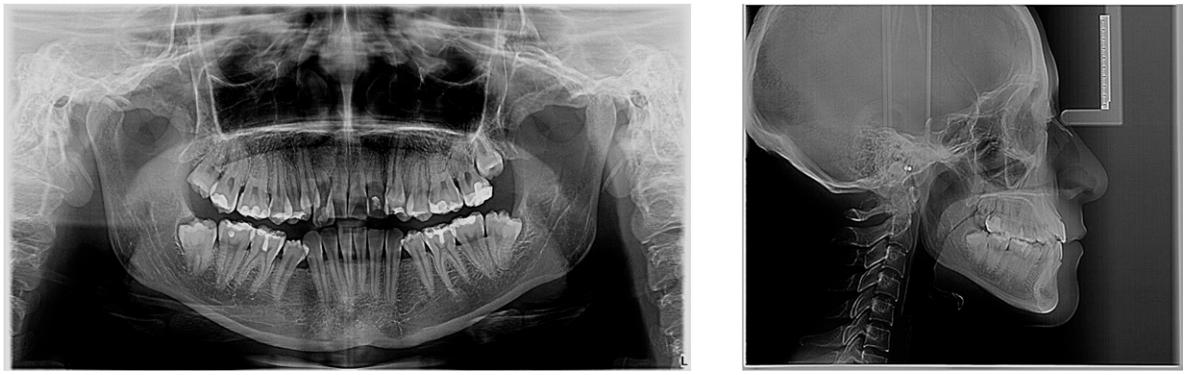

Figure 3. Initial orthodontic studies, from left to right, orthopantomography and lateral head film.

arch; decreased root length in the upper anterior teeth and stable reduced periodontium. The treatment objectives were focused on improving the periodontal health, stability, function, and esthetics of the patient. Among these were: improve the height of the alveolar ridge, eliminate interferences, correct mandibular deviation, obtain canine and molar class I, eliminate unilateral anterior and posterior crossbite, improve arch form, eliminate crowding, and correct the axial axis of upper and lower incisors. Based on these objectives, an orthodontic treatment plan was elaborated with extractions of upper second premolars because they had extensive and defective restorations.

Table 1.
Summary of initial cephalometric values

Value	Norm	Patient
SNA	82° ±2	85°
SNB	80° ±2	87°
ANB	2° ±2	-2°
Convexity	0 mm ±2	2 mm
GoGn/L1	90°	104°
Sn/U1	102°	80°
Maxillary Height	53°	61°
Posterior occlusal plane height	55 mm	8 mm
Articulare angle	123°	136°
Inclination Occlusal plane	14° ±5	31°

Extractions of teeth #15, 25, 18, 28, 38 and 48 were performed. CCO 0.022" X 0.028" metal brackets and 0.014" Nitinol archwires were placed in the upper and lower arches to initiate alignment and leveling. Open NiTi springs were also used to make space for tooth #12 (Figure 4). Subsequently, 0.016" x 0.022" Nitinol archwires were placed in the upper and lower arches to continue alignment and leveling. Open springs and metal ligatures were also indicated to distalize the canines and achieve ideal canine and molar relationships. Lingual buttons were placed on the upper and lower left first and second premolars with elastics to correct the crossbite.

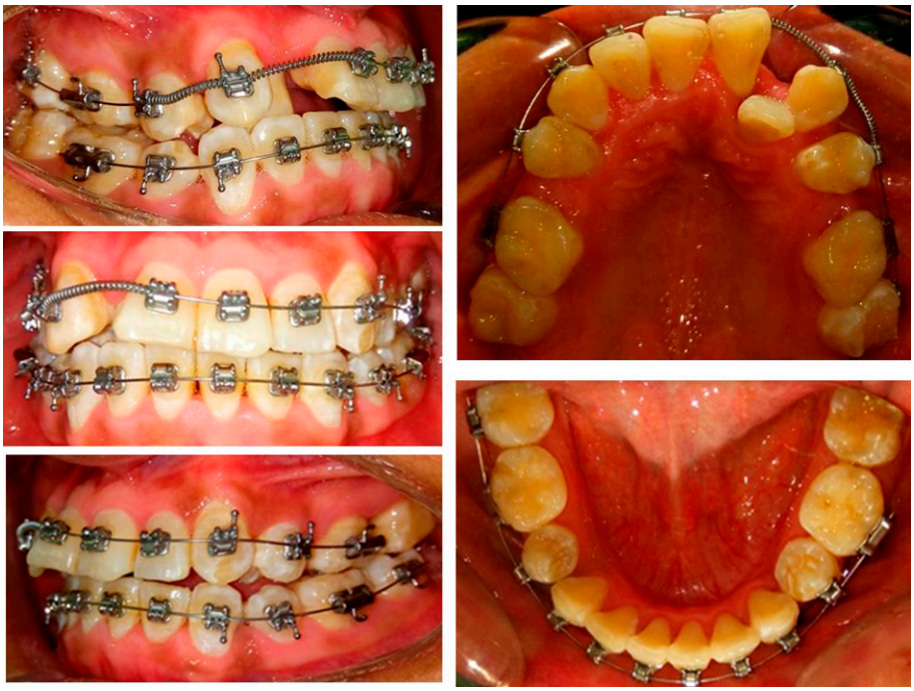

Figure 4. Follow-up intraoral photographs. Phase I. Alignment.

Retraction of the upper anterior segment was performed initially with 0.019" x 0.025" SKL archwires to achieve space closure (Figure 5). This was followed by the placement of 0.019" x 0.025" TMA archwires in the upper and lower arches (Figure 6). At the end of the treatment a fixed retainer was placed from canine to canine with 0.175" braided wire. The final results included: molar and canine I classes on both sides, space closure, good intercuspation, and dental alignment and leveling, thus contributing to maintaining periodontal health (Figure 7). Likewise, the axial axes of the incisors improved as well as the bone topography as can be seen in the final radiographs (Figure 8).

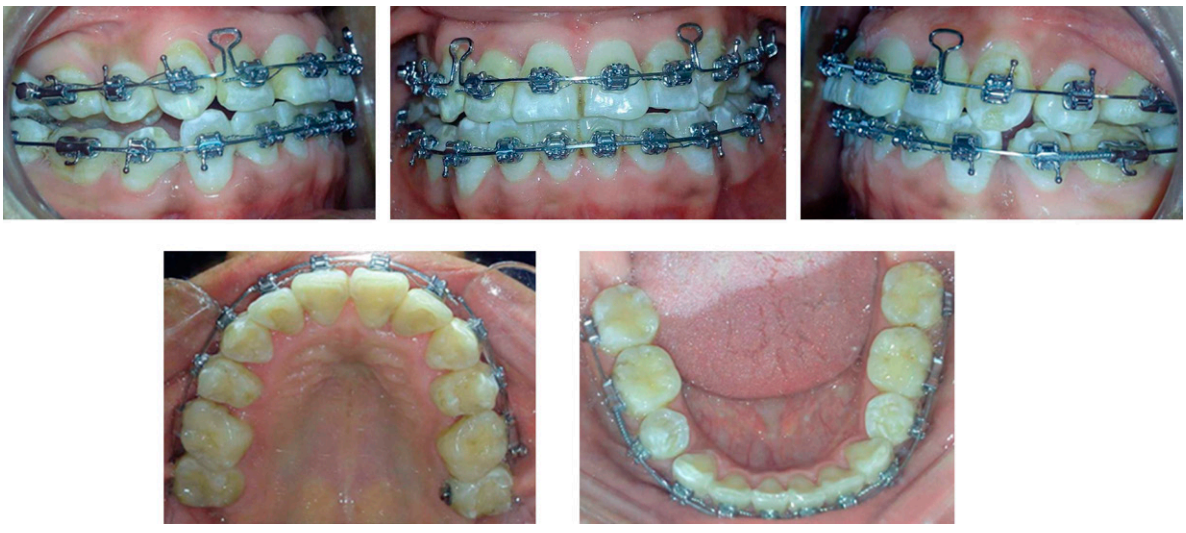

Figure 5. Follow-up intraoral photographs. Phase II. Space closure.

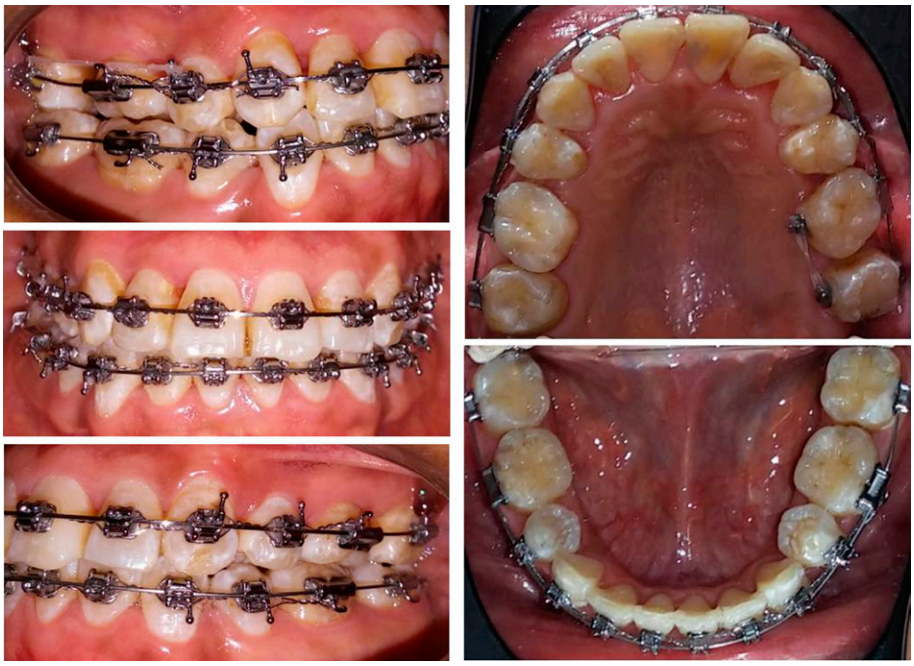

Figure 6. Follow-up intraoral photographs. Phase III. Finishing and detailing.

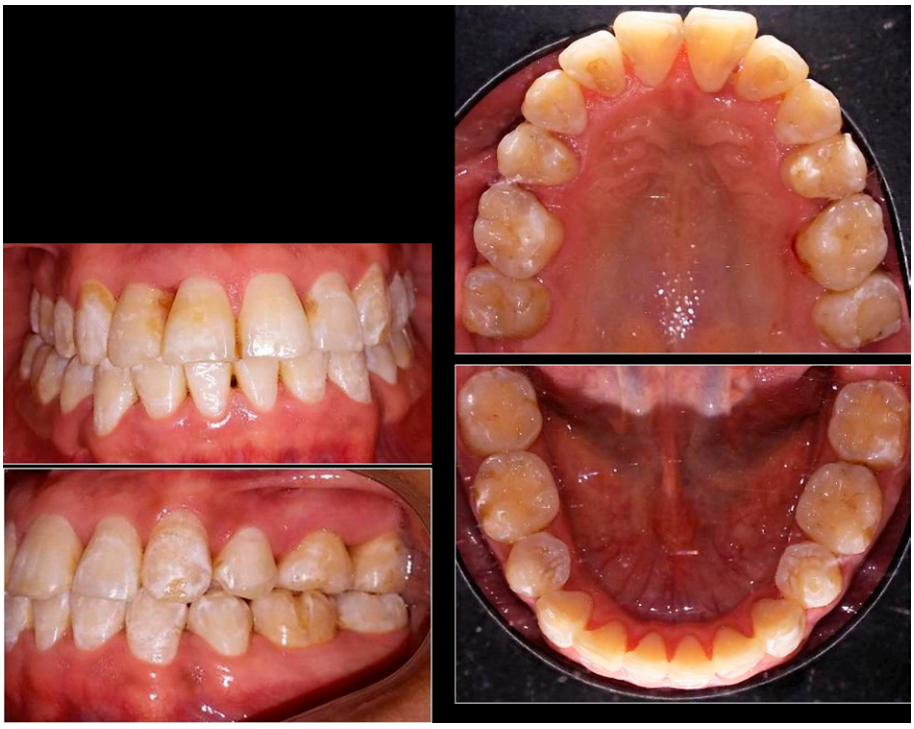

Figure 7. Final intraoral photographs.

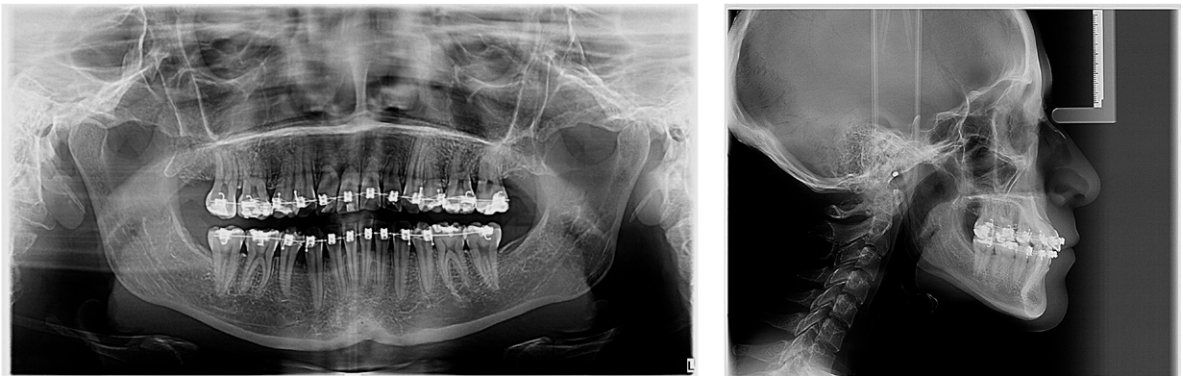

Figure 8. Final imaging studies, from left to right, orthopantomography, and lateral head film.

DISCUSSION

Several authors[6,7] postulate that orthodontic treatment favors the periodontal prognosis of the teeth by improving their functional conditions and also the control of microbial plaque by eliminating or reducing the retentive areas. At the same time, the level of periodontal health is important, a condition that requires exhaustive control of the patient before, during, and after orthodontic therapy, especially in those individuals who are highly susceptible to periodontal disease.

Few studies have been published so far on groups of adults with advanced periodontitis who received comprehensive orthodontic treatment with fixed appliances[8,9]. However, all agree that orthodontic treatment combined with periodontal therapy does not produce negative effects on the periodontium; on the contrary, it can be beneficial. A long-term retrospective study by Boyer *et al*[10] suggests that both treatments preserve periodontal health in the long term and that dental alignment facilitates oral hygiene, which increases patient satisfaction and long-term commitment to maintenance.

Another problem that may arise according to authors such as Shaughnessy *et al*.[11] and Pazera *et al*.[12] occurs when adhering the retainer to the lingual or palatal surface of the teeth. This maneuver should always be performed passively, since if it is actively cemented (by using some type of instrument generating pressure to facilitate its position on the teeth) an iatrogenic force could be generated, causing undesired movements that could influence the position of the teeth after orthodontic treatment. Once the retainer is cemented, it can be the patient himself who causes undesired movements in the teeth by performing improper maneuvers such as ingestion of hard foods, trauma, or incorrect use of dental floss. As indicated above, it is important to consider the height of the lingual or palatal side of the teeth at which the retainer is to be positioned. Ideally, it should be placed at the level of the contact points of the teeth without invading the interdental papilla or the interproximal space. Torkan *et al*.[13], in a study carried out in 2014, reported that there is a greater risk of periodontal involvement when the retainer is placed on the palatal side of the upper teeth and that it should be fixed in a more gingival position to avoid possible interferences when occluding with the lower antagonist teeth, although no significant differences were found after six months[13].

A factor to be considered is the accumulation of plaque around the retainer. For Kaji *et al*.[14] if the retainer is positioned close to the gingival margin, plaque accumulation is greater, while Farret *et al*.[15] relate greater plaque deposition with fixed retainers positioned towards the gingiva

in the interproximal areas of the teeth. Opinions on this are divided between orthodontists who favor the use of fixed retainers and dentists and periodontists who have another perspective. A study by Booth *et al*.[16] indicates that patients who wear fixed retainers are more motivated and develop better hygiene techniques than patients who do not wear fixed retainers.

CONCLUSIONS

Orthodontic treatment in patients with stable reduced periodontium is limited and complex and should be evaluated by a multidisciplinary team in order to achieve defined objectives for realistic but significant results. These patients should always have constant periodontal monitoring and maintain plaque control at all stages of orthodontic treatment.

The advantages offered by this type of procedure are the preservation of the supporting bone and improvement of the gingival contour with the adjacent teeth. However, to avoid any complications, some of the factors to consider during this procedure are controlled application of forces, vitality of the periodontal ligament, adequate anchorage, favorable root shape, control of pulp problems, and sufficient retention period to avoid recurrences.

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