

CLINICAL CASE

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Occlusal Adjustment (Grinding) of Primary Dentition as Assisting Method During Crossbite Treatment in Primary and Early Mixed Dentition – Cases Report

Szlifowanie korekcyjne zębów mlecznych jako działanie wspomagające w leczeniu zgryzu krzyżowego w uzębieniu mlecznym i wczesnym mieszanym – opis przypadków

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A – koncepcja i projekt badania; B – gromadzenie i/lub zestawianie danych; C – opracowanie statystyczne; D – interpretacja danych; E – przygotowanie tekstu; F – zebranie piśmiennictwa

Abstract

A characteristic of all types crossbite malocclusions is that a part of the lower teeth cover the upper teeth and there is an asymmetry of dental arches. The midlines also may be noncoincident. Crossbite malocclusions need to be treated in most cases near the time of recognition because of unfavorable asymmetric patterns, anomalous development to the mandible and maxilla. It contributes to disorders in facial esthetic and it is harmful to the teeth or jaws, including the periodontium. In most cases, one can notice the constriction of the maxilla; therefore, the basic approach to the crossbite treatment is to expand of maxillary arch. This expansion of the maxillary arch during primary and early mixed dentition periods can be achieved by using removable appliances. The wearing time of these appliances, even in well-cooperating patients, is 12 to 14 hours per day. This is the reason why an occlusal adjustment of primary teeth is necessary, assisting method during crossbite treatment. It also helps to maintain the results of the treatment. The aim of the study is to present and to explain the principles of the occlusal adjustment of the primary teeth in the treatment of crossbite malocclusion based on selected cases (**Dent. Med. Probl. 2012, 49, 4, 611–616**).

Key words: crossbite malocclusion, occlusal adjustment (grinding) of primary teeth, early treatment.

Streszczenie

Wszystkie odmiany zgryzu krzyżowego charakteryzują się tym, że część zębów dolnych pokrywa zęby górne, występuje zaburzenie symetrii łuków zębowych, czasem także linii pośrodkowej. Leczenie zgryzu krzyżowego w większości przypadków powinno być podjęte zaraz po rozpoznaniu, ponieważ powoduje nieprawidłowy, asymetryczny rozwój szczęki i żuchwy. Prowadzi to do zaburzeń w estetyce twarzy i uszkodzeń zębów, szczęk i przyzębia. W większości przypadków występuje zwężenie szczęki, dlatego podstawowym sposobem leczenia zgryzu krzyżowego jest rozbudowa górnego łuku zębowego w części lub całości. W okresie uzębienia mlecznego i wczesnego mieszanego stosuje się w tym celu głównie aparaty zdejmowane. Nawet u dobrze współpracujących pacjentów czas noszenia aparatów wynosi zwykle 12–14 godz. dziennie. Szlifowanie korekcyjne zębów mlecznych podczas leczenia jest zatem zabiegiem niezbędnym, wspomagającym zarówno samo leczenie, jak i pomagającym utrwalić jego wyniki. Celem pracy jest przedstawienie i wyjaśnienie na podstawie przypadków własnych zasad szlifowania korekcyjnego zębów mlecznych w leczeniu zgryzu krzyżowego (**Dent. Med. Probl. 2012, 49, 4, 611–616**).

Słowa kluczowe: zgryz krzyżowy, korekcyjne szlifowanie zębów mlecznych, wczesne leczenie.

The crossbite malocclusion (CM) is a relatively frequent disharmony. Epidemiologic studies describe its frequency from 8.7% to 23.3% of all

malocclusions [1–3]. Polish data shows the values from 10.8% [4] to 16.09% [5] or even 21.94% [6]. According to the Polish diagnostic system (Or-

lik-Grzybowska) the crossbite malocclusion is a transversal disharmony. A characteristic of all types crossbite malocclusions is that a part of the lower teeth cover the upper teeth and there is an asymmetry of dental arches. The midlines also may be noncoincident. The function is unbalanced, transverse movements are restricted. Other authors [7] expand this definition and describe crossbites as skeletal, dental and functional asymmetries, or as a combination of these factors. Morphologic anomalies lead to asymmetric, anomalous development to the mandible and maxilla. According to Enlow's matrix theory [8], the growth of each facial region is linked to that of other structural counterparts. As a consequence, any alteration in some portion of craniofacial complex produces an equal alteration in another part, aiming at functional final balance. Imbalance results from differences in the quantity or direction of growth between parts and counterparts. The crossbite malocclusion is a perfect example of this rule. The untreated crossbite leads to constriction of maxilla, asymmetric and/or excessive growth of mandible and temporomandibular joint dysfunction. Therefore, it needs to be treated in most cases near the time of recognition [9].

The aim of the study is to present the advantages and to explain the principles of the occlusal adjustment (grinding) of the primary teeth as an assisting method during the treatment of crossbite malocclusion based on literature and selected cases.

Discussion

The aim of early treatment of crossbite malocclusion is the correction of abnormal situated teeth and the asymmetry of dental arches, maxilla and mandible. It leads to the restoration of its proper function and to afford possibilities for further normal development of craniofacial complex. In most cases, we can notice the constriction of the maxilla; therefore, the basic approach to the crossbite treatment is to expand the maxillary arch. We can achieve the expansion of the maxillary arch during primary and early mixed dentition periods mainly by using removable appliances. According to the literature [10] microelectronic monitoring showed an average of 7.65 hours per day of removable appliance wear which was only a 50–60% fulfillment of wearing instructions, decreasing to below 35% at the sixth appointment. This is the reason why we should eliminate morphologic factors which produced malocclusion and as soon as possible restore the proper function.

The pressing force is applied vertically to the tangence of the tooth protuberance in the point of osculation, as it is shown in Fig. 1 during the occlusion. We can divide it into two components: vertical and horizontal. The second one increases the defect and counteracts orthodontic treatment. The first goal of occlusal adjustment is to minimize horizontal compound or reverse its vector. We can achieve this by modeling occlusal surfaces as it is shown in Fig. 2. Occlusal adjustment of deciduous molars and incisal edges of deciduous incisors or canines which are in a crossbite relationship produces inclined surfaces. This leads to a change of angulation of the teeth and dentoalveolar processes. The grinding of deciduous teeth on the opposite side is necessary if the patient cannot line up upper and lower midlines because of prematural contacts on this side. The determining factors of the extent of grinding should be: a risk of complication from deciduous teeth, intensity of defect and patient compliance.

The second goal of occlusal adjustment of primary dentition is to correct the normal function. Prematural contacts affect the masticatory cycle producing mandibular shift on the crossbite side and restricting retrusive movements. According to Neto et al. [11] prematural contacts produce asymmetric changes in the tension of masticatory muscles. It can lead to morphologic anomalies and can pathologically alter the growth patterns [9]. The functional posterior crossbite or class 3 malocclusion can appear as a result. Therefore, we should analyze anteroposterior and lateral movements each time and eliminate prematural contacts. Clinical examination of the mandibular movement from postural-rest position to centric relationship (free way) is also very important. If in postural-rest position midlines are coincident, and after dental contacts in centric occlusion, there is a mandibular shift due to prematural contacts in maximal intercuspation (shift of free way), it means the function is still correct. Masztalerz describes it as laterocclusion or dental leading crossbite. Treatment prognosis is good. After functional adaptation we can notice eccentric position of mandible in postural-rest position (translation of free way). This is functional anchorage of malocclusion [12] and the prognosis is worse. The treatment requires changes in function and morphology respectively [9, 13, 14]. Further development of malocclusion produces skeletal changes, which may require surgical correction only.

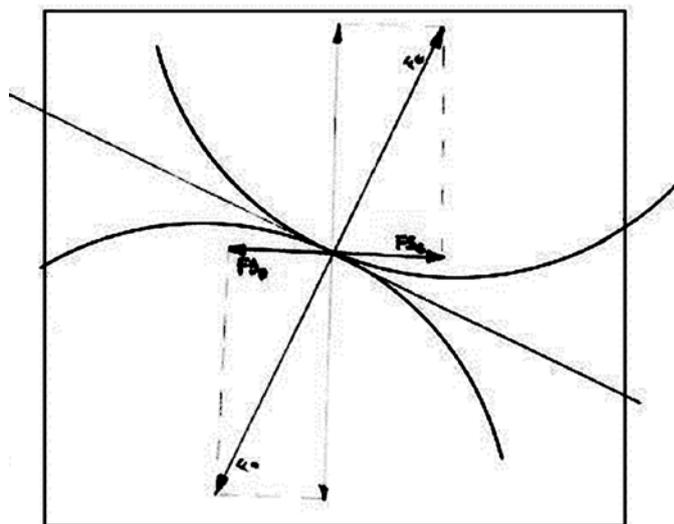


Fig. 1. Pressing force

Ryc. 1. Siła działająca na ząb

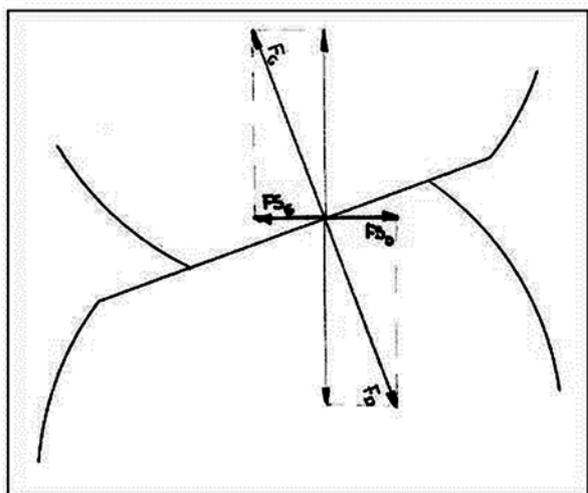
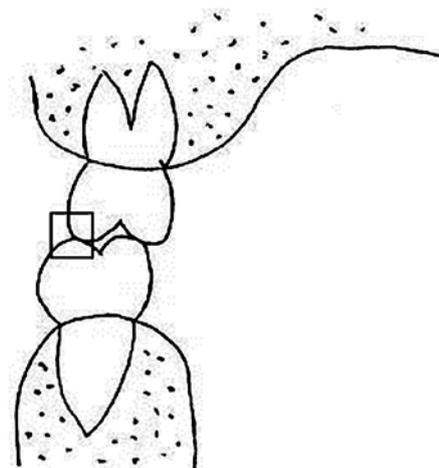
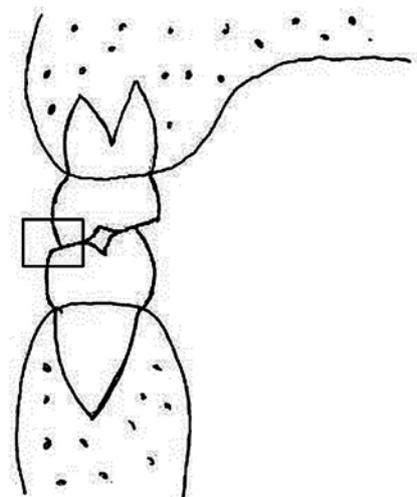


Fig. 2. Modeling occlusal surfaces. FG – force applying on upper tooth; FSG – horizontal component of force applying on upper tooth; FD – force applying on lower tooth; FSD – horizontal component of force applying on lower tooth

Ryc. 2. Modelowanie powierzchni zęba. FG – siła działająca na górny ząb; FSG – pozioma składowa siły działającej na górny ząb; FD – siła działająca na dolny ząb; FSD – pozioma składowa siły działającej na dolny ząb



Case Reports

Case 1

A boy (ML) aged 8 years old, came to the clinic for orthodontic treatment in February 2011. The diagnosis was total crossbite on the right side with a tendency of class III. Mandible movements were restricted. Treatment was conducted with Schwarz appliance with flat acrylic guides in posterior region bilaterally and descendent arch. Occlusal ad-

justment was performed two times during treatment: to produce inclined surfaces on the right molars and to eliminate premature contacts on the right and left canines. The treatment was accomplished after 11 months.

Case 2

A boy (PP) aged 9 years old, came to the clinic for orthodontic treatment in October 2010. The diagnosis was crossbite in region of tooth 63. Man-

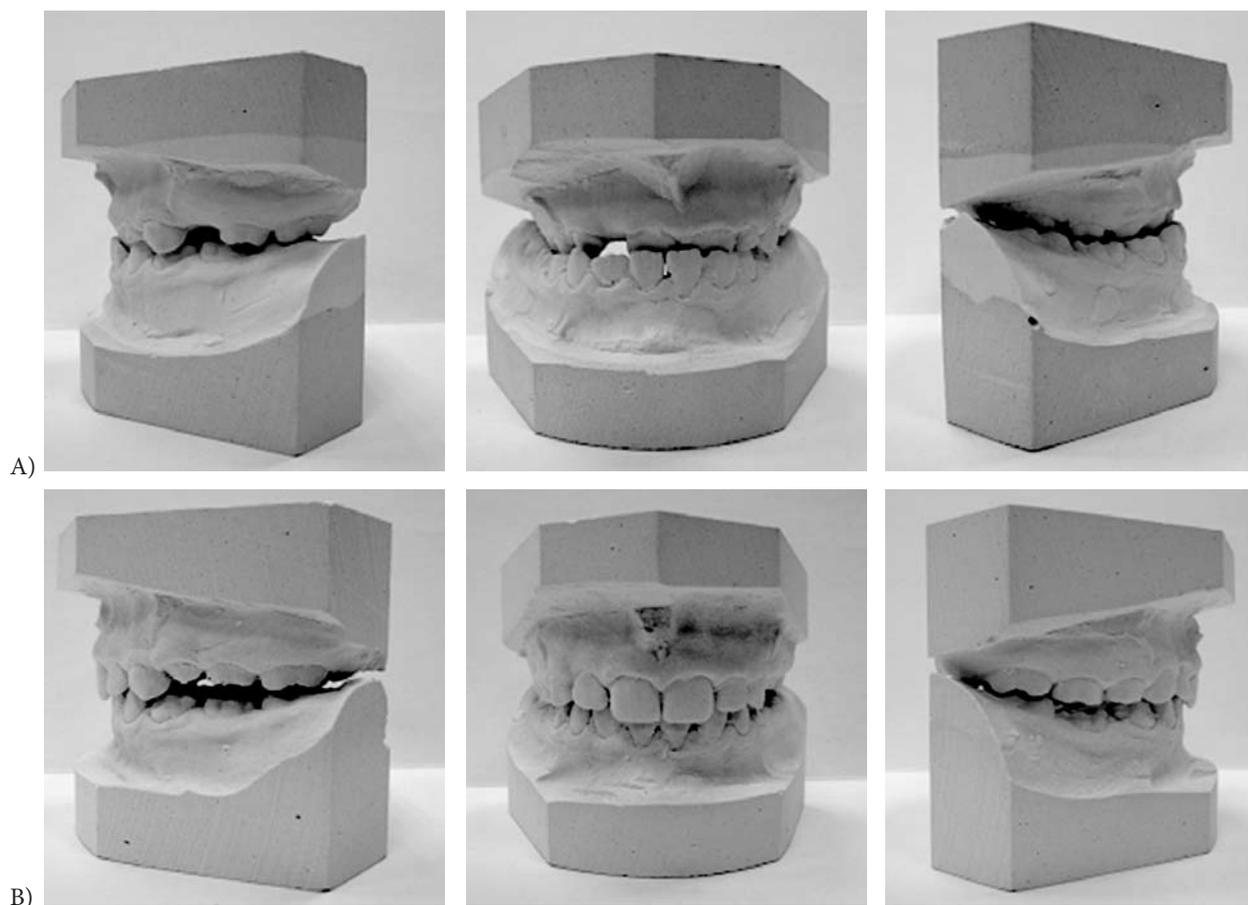


Fig. 3. Case 1: A) ML occlusion condition before treatment, B) ML after treatment

Ryc. 3. Przypadek 1: A) ML warunki zgryzowe przed leczeniem, B) ML po leczeniu

dible movements were restricted. Treatment was conducted with Schwarz appliance with flat acrylic guides in posterior region bilaterally. Occlusal adjustment was performed three times during treatment: to produce inclined surfaces on the left canines and to eliminate prematural contacts on the right and left canines. The treatment was accomplished after 11 months.

Case 3

A boy (FM) aged 8 years old, came to the clinic for orthodontic treatment in December 2008. The diagnosis was total crossbite on the right side. Mandible movements were restricted. Treatment was conducted with Schwarz appliance with flat acrylic guides in posterior region bilaterally. Occlusal adjustment was performed four times during treatment: to produce inclined surfaces on the right molars and to eliminate prematural contacts on the right and left canines. The treatment was accomplished after 10 months.

Occlusal adjustment was proceeded with high-speed turbine with water spray and fine diamond bur in all cases. Local anaesthesia was not necessary. Teeth were covered by fluoride varnish after each procedure. In addition, the exercising the symmetrical chewing and placing mandible was ordered.

Conclusions

Occlusal adjustment (grinding) of primary dentition is effective and economic procedure used during crossbite treatment. Such results have been confirmed in clinical cases and literature [9, 14–17]. The principles of using this protocol are simple. They result from biomechanic and eliminate prematural contacts during occlusion. It helps to restore balanced and proper articulation [9, 14, 15]. This is the reason why occlusal adjustment of primary teeth is necessary, assisting method during crossbite treatment, especially with removable appliances. It also helps to maintain the results of the treatment.

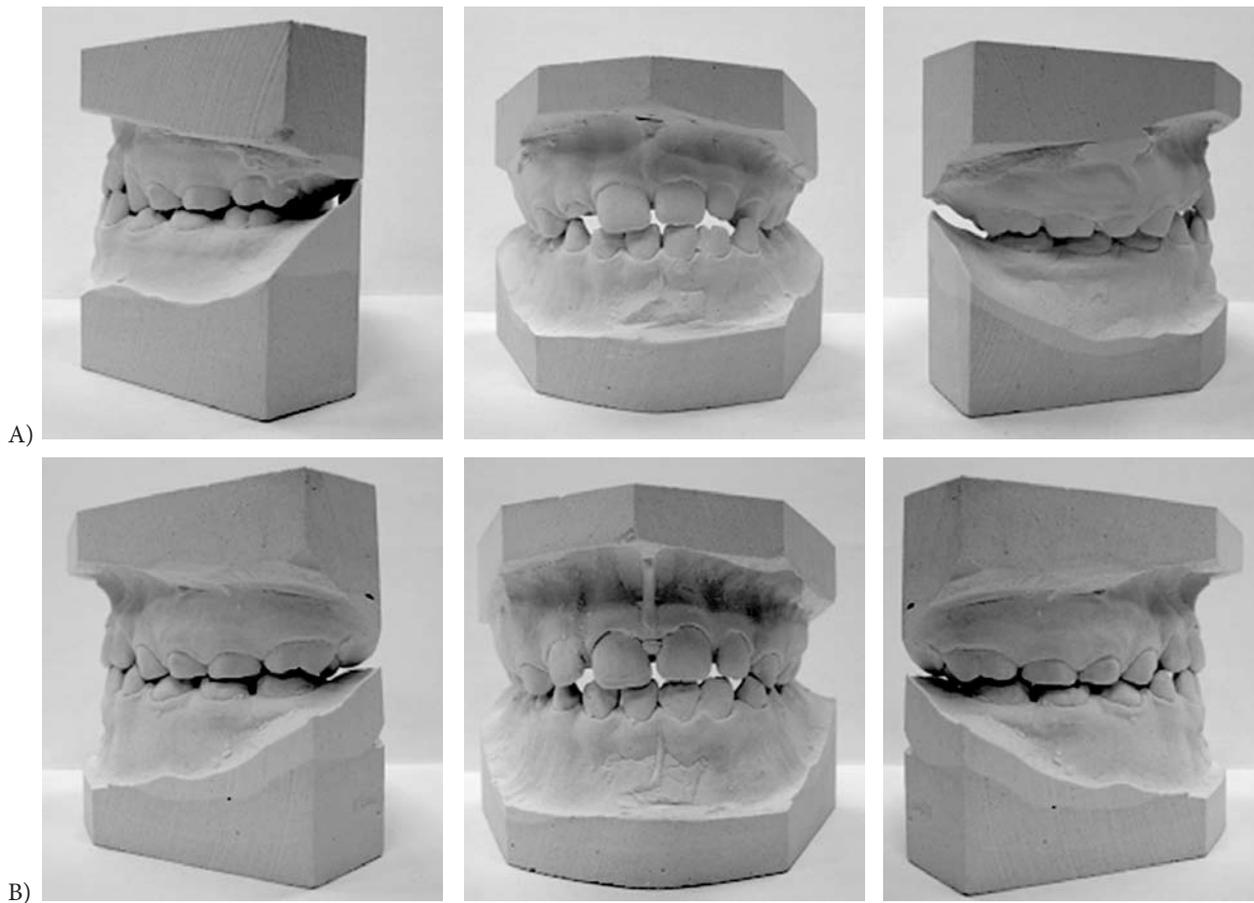


Fig. 4. Case 2: A) PP occlusion condition before treatment, B) PP after treatment
Ryc. 4. Przypadek 2: A) PP warunki zgryzowe przed leczeniem, B) PP po leczeniu

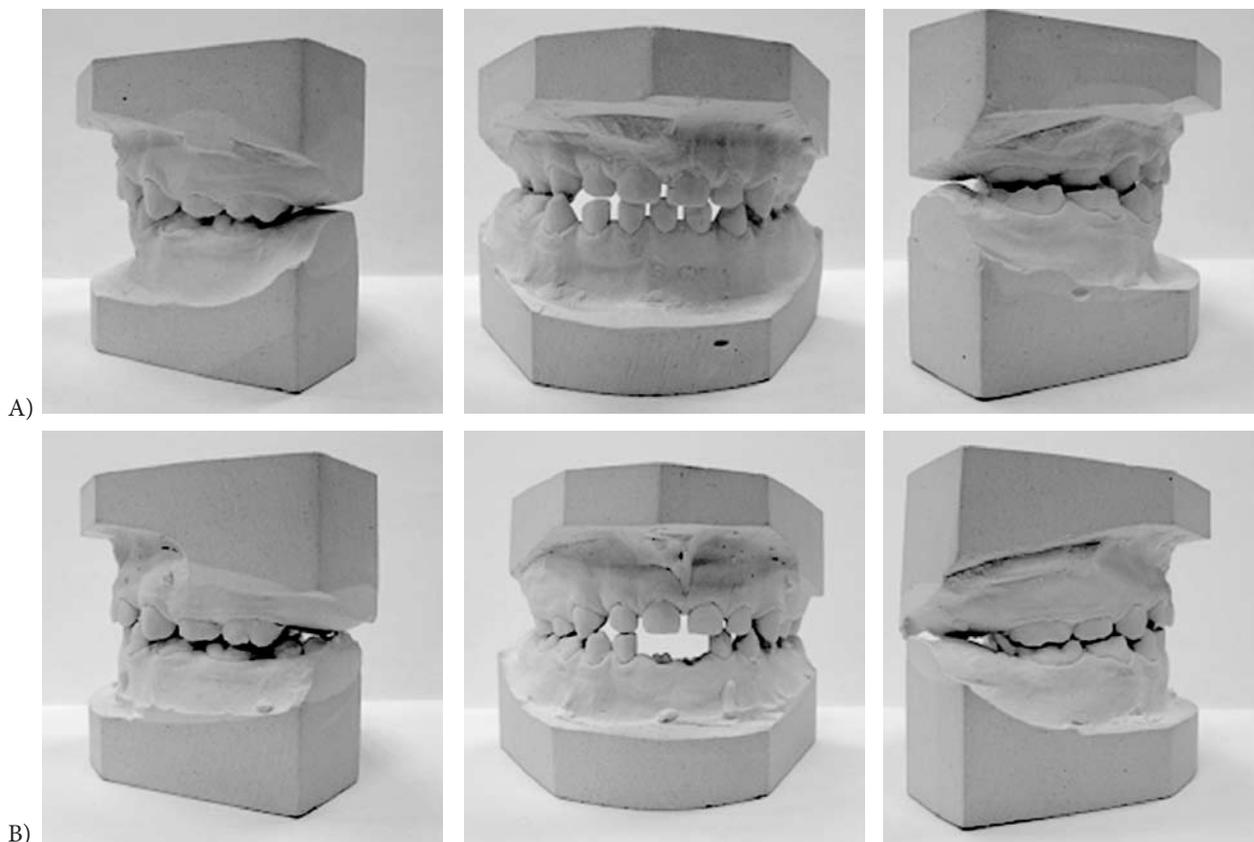


Fig. 5. Case 3: A) FM occlusion condition before treatment, B) FM after treatment
Ryc. 5. Przypadek 3: A) FM warunki zgryzowe przed leczeniem, B) FM po leczeniu

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