# *Nail Matrix Arrest during the Course of Hand, Foot and Mouth Disease: Evaluation of Onychomadesis Cases*

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**Abstract**

**Objective:** Hand foot, and mouth disease (HFMD) is an infectious disease that is particularly common in children. HFMD is clinically characterized by erosive stomatitis that occurs with vesicular and maculopapular rash. This rash is frequently observed in the hands and feet and sometimes in the gluteal and inguinal regions. It is known that various enteroviruses, including coxsackievirus, echovirus, and enterovirus 71, may be causative agents. HFMD is usually a self-limited and benign condition; however, fatal cardiopulmonary and neurological complications may be occasionally observed cases with enterovirus 71 infection. Onychomadesis is defined as proximal nail plate separation with a temporary arrest in the activity of the nail matrix. In this article, we present four onychomadesis cases that occurred as a rare complication of HFMD.

**Material and Methods:** In the present study, we included patients who presented with onychomadesis after HFMD diagnosis between January 2013 and December 2014 at the Hacettepe University Faculty of Medicine, Pediatric Infectious Diseases Outpatient Clinic.

**Results:** Four onychomadesis cases diagnosed with HFMD were included in this study. All patients were males, and their ages were 11 years, 21 months, 7 years, and 27 months. The underlying disease in one patient was ALL in remission. None of the patients had a history of skin disease. The periods from HFMD diagnosis to nail changes were 3 weeks and 2 months for the first two patients and 4 weeks for the other two patients. Onychomadesis was improved without any treatment during the follow-up.

**Conclusion:** Onychomadesis after HFMD is a benign clinical disorder. In the differential diagnosis of pediatric cases of onychomadesis, the patients should be queried about a history of HFMD. *(J Pediatr Inf 2015; 9: 64-7)*

**Keywords:** Hand, foot, and mouth disease, child, onychomadesis

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## Introduction

Hand, foot and mouth disease (HFMD) is very contagious disease with a self-limited benign course, frequently seen in children. HFMD is clinically characterized by erosive stomatitis concomitant with vesicular and maculopapular rash that is frequently seen in the hands and feet and sometimes in the gluteal and inguinal regions (1-3). Nevertheless, epidemics have been seen in recent years in the Asian countries especially in the Western Pacific Regions and have been associated with neurological complications (4).

Onychomadesis is defined as proximal nail plate separation with the temporary arrest in the activity of the nail matrix (5). As onychomadesis can be secondary to infections, autoimmune diseases, drugs and traumas, it can be hereditary as well (6). In this article, we aimed to emphasize the secondary onychomadesis of HFMD, which may have a high morbidity, but has mostly a benign course (Table 1).

## Case Reports

### Case 1

The 11-year old male patient previously diagnosed with ALL with Call positive B Cell

**Table 1.** General characteristics of four onychomadesis cases

| | Case 1 | Case 2 | Case 3 | Case 4 |
|---|---|---|---|---|
| Age | 11 years old | 21 months | 7 years old | 27 months |
| Gender | Male | Male | Male | Male |
| Period that passed till changes on the nails after HFMD | 3 weeks | 2 weeks | 4 weeks | 4 weeks |
| History of skin disease | - | - | - | - |
| Underlying disease /risk factor | On remission ALL | - | - | - |
| Onychomadesis treatment | Follow -up | Follow -up | Follow -up | Follow -up |
| HDFMD: Hand, foot, and mouth disease | | | | |

and the St Jude Total XIII protocol applied between April and February 2010 and had been on remission for 3.5 years, applied with the complaints of rashes in the hand and toe nails to the Pediatric Infectious Diseases outpatient clinic of Hacettepe University. We were informed that the patient had body temperature of 40 $^0$C followed by regular limited rashes in the hands, feet, in-mouth and inguinal sometimes in the gluteal regions.

The patient and his family reported that the rashes without a history of itching improved by acquiring a whitish color within a week, and that three weeks later in the follow-up, firstly the nails on two index fingers and then those on other finger and the nails on two toes started to fall off.

We also learnt that the patient was given a local treatment at the health center he presented with complaints rashes and nails falling off and referred to our policlinic for further examination after the nails fell off again. In the physical examination of the patient, onychomadesis was present on the hand nails and two toes of the patient (Figure 1, 2). Other system findings were within normal limits. Patient's onychomadesis healed during the follow-up without any treatment.

**Case 2**

Twenty-month-old male infant presented with the complaints of rashes on the nails to the Infectious Diseases Policlinic of Hacettepe University. We were informed that the infant had itchy vesicular rashes first on the hands, feet and in the mouth; the body temperature rose as high as 38.6°C during this period lasting for two days. We also learnt that after the rashes

**Figure 1.** Left hand 2-4 fingers onychomadesis

**Figure 2.** Onychomadesis seen on the nails of both hands

improved, without any peeling on the hand and feet, and then without any trauma, periungual redness or dermatitis, nail on the hand and feet started to fall off. The test results of the patient were not compatible with the recently experienced varicella infection. It was though that due to the typical symptoms and findings, a previous hand, foot, and mouth disease and secondary to this, onychomadesis developed. A follow-up was recommended with any treatment, which was followed by healing.

**Cases 3 and 4**

The third and fourth cases were 7 years and 27 months old male patients respectively who did not have any history of particularity. After they had a course of HFMD, both patients were diagnosed with onychoma-

desis following the detection of nail disorder on the hand nails. In the follow-up, the nail disorder improved without treatment.

## Discussion

Hand, foot and mouth disease can be a sporadic whereas it can cause epidemics. Moreover, although it is mostly self-limited, it can cause complications as well (7). The link onychomadesis and between hand, foot, and mouth disease was first suggested by Clements et al. (8). Nail matrix is responsible for the formation proximal nail plate and gestationally starts to appear from 10$^{th}$ week onwards; and it continues to develop in the neonatal period (8). Beau's lines is a nail disorder that appears as dents or cavities on the nail plate in which nail matrix function temporarily discontinues due to various reasons and if the Beau's lines result in total loss of matrix continuity or temporary discontinuation, it is called onychomadesis.

It was reported in the literature that while onychomadesis might be associated with systemic diseases, traumas, drugs, malnutrition, periungal dermatitis and infections, hereditary and idiopathic cases were present as well (6, 9). Onychomadesis is secondary to the most frequent HFMD among the infectious diseases (6). Following the HFMD cases in the United States of America, Europe, Japan and Taiwan, onychomadesis cases were reported and it was quite noticeable that all cases were children. Despite the presence of HFMD in adults, it is still unknown why onychomadesis is seen in children but not in adults (2). While changes on nails in these cases were reported in four weeks the earliest in the literature, it was observed that this period was as low as two weeks in our case (6).

While hand, foot, and mouth disease is seen with mostly frequently with coxsackie virus A16 as well as coxsackie virus A6, A7, A9, A10, B1, B2, B3, B5; it is also seen with echoviruses E3, E4, E9 and various enteroviruses such as enterovirus 71, onychomadesis cases followed by HFMD were reported to be secondary to coxsackie virus A6. Apart from that, it was also reported that onychomadesis was secondary following the cases of coxsackie virus A5, A6, A10, A16, B1, B3, echovirus 3, 4, 9 and enterovirus 71 (5, 6). Since our patients had the typical HFMD clinical picture, no virus typology was implemented.

It is not exactly known how onychomadesis develops in hand, foot and mouth disease. Nevertheless, it is thought that inflammation-driven skin rashes developing in relation to enteroviruses around the nail fold may be the reason. There is no special therapy for the patients who develop HFMD-driven onychomadesis. This clinical picture was self-limited in the follow-up and nail disorder improves following the removal of matrix arrest (6, 10).

## Conclusion

In conclusion, while onychomadesis may have various causes, onychomadesis after hand, foot and mouth disease is a benign clinical disorder. The Hand, foot, mouth disease should always be questioned in pediatric patients with onychomadesis in the differential diagnosis.

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