



## Endodontic patient with rhinocerebral mucormycosis: clinical case report

### *Paciente endodóntico con mucormicosis rinocerebral: reporte de un caso*

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#### ABSTRACT

A patient previously diagnosed with cerebral mucormycosis attended the Endodontics Clinic of the Graduate and Research School, National School of Dentistry, National University of Mexico (UNAM). This article presents variations in the clinical handling of the patient; stress is made on the importance of preserving the greatest number of teeth in the mouth to thus achieve better stability of the palatal obturator and establish suitable phonation and mastication functions.

**Key words:** Rhinocerebral mucormycosis, zygomycosis, palate necrosis.

**Palabras clave:** Mucormicosis rinocerebral, zigomicosis, necrosis de paladar.

#### RESUMEN

Se presenta en la Clínica de Endodoncia de la División de Estudios de Postgrado e Investigación (DEPeI) de la Facultad de Odontología (UNAM) una paciente diagnosticada con mucormicosis rinocerebral; en este artículo se presentan las variaciones en el manejo clínico de esta paciente y la importancia de mantener el mayor número de órganos dentales en boca para una mejor estabilidad del obturador palatino, tanto para las funciones de fonación como de masticación adecuadas.

#### INTRODUCTION

Mucormycosis, also called zygomycosis or phycomyosis is an uncommon, opportunist, acute infection with high morbidity rate. It is caused by a certain number of fungi species, classified in the *Mucorales* order of the *Zygomycetes* class, among which *Rhizopus*, *Mucor* and *Absidia* can be found.<sup>1</sup> These saprophyte fungi can be isolated in fruit, vegetables or water, but they are more common in hospital environments.

#### EPIDEMIOLOGY

Mucormycosis is present worldwide, and, as many other low pathogenic capacity fungi infections, it requires weakening factors in the host. According to the clinical variety, among conditions which favor the development of this infection we can count: unbalanced diabetes mellitus, leukemia, treatments with anti-inflammatory steroids, prolonged treatment with acetylsalicylic acid, and in recent years, many cases of HIV-associated mucormycosis have been published<sup>2-8</sup> (Figure 1).

The most frequent clinical presentation is the rhinocerebral variety; this is one of the fungal infections

exhibiting most rapid advance in humans. It generally has its onset in the nose and para-nasal sinuses.<sup>9</sup>

General mortality rate due to mucormycosis is 44% in diabetic patients, 35% in patients lacking underlying diseases, and 66% in patients with malignant tumors. Mortality rates vary according to the infection location: 96% in patients with disseminated infections, 85% in patients with gastrointestinal infections and 76% in patients with lung infections.<sup>11</sup>

#### CLINICAL CASE

A 20 year old female patient attended the clinical service of the Endodontics Department at the Graduate and Research School of the National School of Dentistry, National University of Mexico (UNAM)

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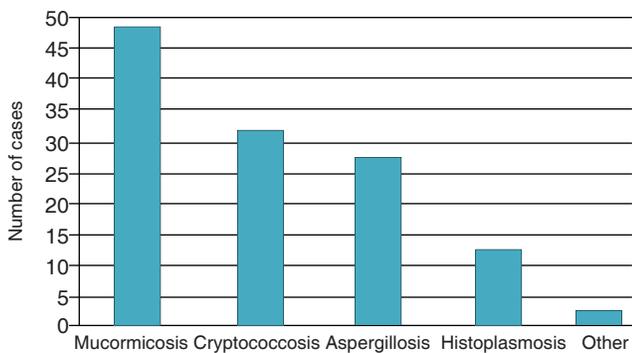
(Figures 2 and 3). The patient had been referred from the «Manuel Gea González» Hospital in order to receive root canal treatment in teeth which so required.

**HISTORY**

The patient had been infected with the fungus in a hospital environment, where she had been admitted due to a sinusitis process; at that moment the patient suffered a depressed immunological system. Personal pathological history of the patient was: rhinocerebral mucormycosis at age 14, followed by cerebral

thrombosis, cerebral infarction, state of coma for three months, partial paralysis of the left side of her body as well as muscle spasms at the level of the hip, neck and head. In order to remove fungus-affected tissues, the patient had been operated on the ocular globe, nose, cygomatic bones and palate (Figures 4A and B, 5 to 8).

At the Endodontic Department, during the course of one year, root canal treatment was conducted on teeth number 11, 12, 16, 21, 22, 24 and 36 (Table I and Figure 9). The patient was sent to the Advanced Restorative Dentistry Department for rehabilitation,



**Figure 1.** Number of systemic mycosis cases diagnosed at the Specialties Hospital of the Siglo XXI National Medical Center (Hospital de Especialidades Centro Médico Nacional Siglo XXI), Mexico City.<sup>10</sup>



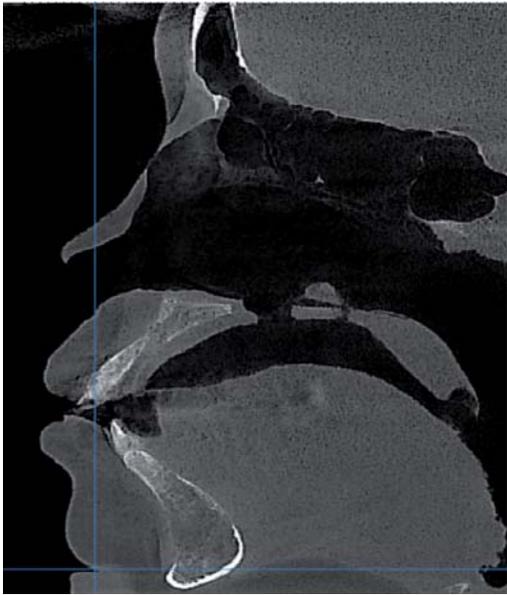
**Figure 3.** Depression at the level of the ocular globe and nostrils, caused by surgery to remove fungus-affected necrotic tissue.



**Figure 2.** Frontal view of rhinocerebral mucormycosis patient.



**Figure 4A.** Computarized axial tomography (CAT) where orbital region collapse can be observed.



**Figure 4B.** In lateral view, bucco-nasal communication can be observed as well as absence of the vomer bone.



**Figure 5.** 3D CAT scan image exhibiting bone destruction at the level of the nostrils and zygomatic bones.



**Figures 6 and 7.**

Occlusal view of upper arch and obturator presented by the patient at the appointment. The obturator would get dislodged when the patient chewed.



**Figure 8.** Lower occlusal photograph where tooth crowding can be observed in the anterior segment, as well as resin, amalgam and zinc oxide and eugenol restorations in tooth 36.

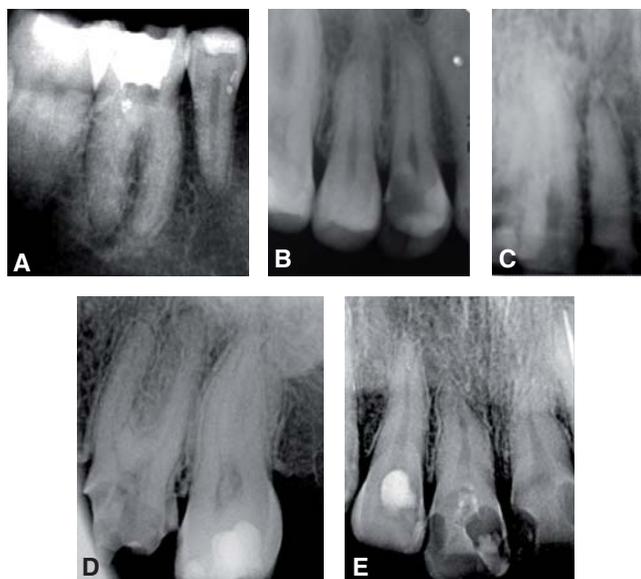
she was equally sent to the Maxillofacial Prosthesis Department in order to manufacture a provisional obturator and an ocular depth device.

Due to the muscle spasms at the hip which afflicted the patient, appointments for clinical treatment had to be short. When considering involuntary movements due to muscle contractions at the head and neck, the use of rotary systems had to be carefully handled in order to prevent instrument fracture. In this case, 2.5% sodium hypochlorite (NaOCL) solutions were used. In all treatments working lengths were obtained with an electronic foramina locator. As final irrigation, a sequence of 2.5% NaOCL, bi-distilled water, 17% ethylenediaminetetraacetic acid (EDTA), bi-distilled

**Table I.** Affected teeth diagnoses.

Tooth	Pulp diagnosis	Periapical diagnosis
11	Irreversible pulpitis	Healthy
12	Necrosis	CAP <sup>¶</sup>
16	Irreversible pulpitis	Healthy
21	Irreversible pulpitis	Healthy
22	Irreversible pulpitis	Healthy
24	Irreversible pulpitis	Healthy
36	Pulpless tooth	CAP <sup>¶</sup>

<sup>¶</sup>CAP = chronic apical periodontitis.



**Figure 9.** Initial X-rays of affected teeth: **A)** tooth number 36, **B)** tooth number 24, **C)** tooth number 12, **D)** tooth number 16, **E)** teeth number 11, 21, 22.

water and alcohol was used. Sealapex (Sybron/Kerr<sup>®</sup>) was the cement used. Teeth with diagnoses of pulp necrosis or teeth without pulp were filled at a second appointment. Between appointments, these teeth were medicated with calcium hydroxide. The use of isolation procedures with a rubber dam had to be modified in all appointments, so as to allow a more accessible airway for the patient, since, due to previous surgeries she experienced difficulties in properly breathing through the nose (*Figures 10 and 11*).

Tooth number 21 exhibited root resorption, which was ascertained with placement of calcium hydroxide and iodoform as a contrasting medium. After this, it was filled up to the length indicated by the foramina electric locator (*Figure 12*).



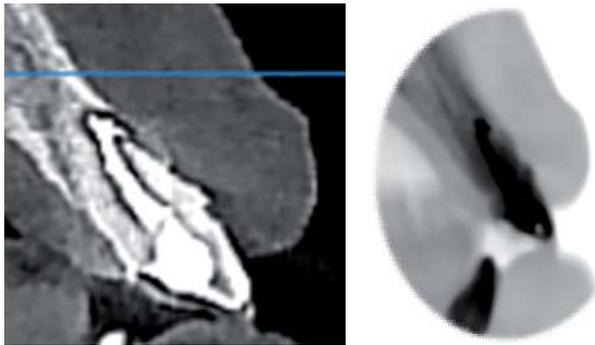
**Figure 10.** Rubber dam modification due to the fact that the patient was a mouth-breather.



**Figure 11.** Final fillings X-rays.

At the one year follow-up visit, the following was observed: in teeth number 12, 24 and 36 periapical status reparation was observed where chronic apical periodontitis (CAP) existed, as well as placement of glass fiber posts conducted by clinicians of the Advanced Restorative Dentistry Department (*Figure 13*). Metal-porcelain crowns were placed on teeth 36, 24, resin was applied to tooth 22; teeth 11, 12 and 21 were prepared for crowns, and provisional crowns were placed.

At the department of Maxillofacial Prosthesis a provisional obturator was designed, moreover the patient was instructed on how to use an ocular deepening device, in preparation for a later placement of ocular prosthesis.



**Figure 12.** CAT scan images with lateral view where root resorption and sealing can be observed.



**Figure 13.** Radiographic follow-up one year after root canal treatments.

**DISCUSSION**

Dr. Antonio Barron et al, in 2001 mentioned that this disease was present in immune-compromised patients, 70% in patients with type II diabetes mellitus.<sup>12</sup> Dr. Jung et al, in 2009 presented a series of 12 cases of rhinocerebral mucormycosis, in which they observed a 50% mortality rate when only drug therapy was used, whereas patients who had undergone surgical treatment along with drug treatment, exhibited 30% mortality rate.<sup>13</sup> According to reviewed scientific literature, computerized tomography (CT) and magnetic resonance imaging (MRI) are useful in diagnostic studies of rhinocerebral mucormycosis, nevertheless, it has been found that MRI exhibited greater sensitivity to study intra-cranial area and peri-orbital tissue.<sup>14,15</sup>

**CONCLUSIONS**

This type of patients are more reluctant to accept medical-surgical procedures, since for them, emotional and psychological factors play an important role. In



**Figures 14 and 15.**

Restorations' occlusal and lateral photographs taken by the Advanced Restoration Dentistry Department.



**Figures 16 and 17.**

Provisional obturator and ocular deepening device in pl

those cases where there is excessive palatine bone loss, it is essential to preserve the greater number of teeth in the mouth so as to achieve stability with the obturator.<sup>16</sup> In cases when the palatine bone defect is very extensive and affects root surfaces, NaOCL irrigation will need to be modified, resorting to lower concentrations, in order to avoid irritation to adjacent tissues caused by a possible extrusion. Interdisciplinary handling of these patients is essential in order to achieve greater success in undertaken treatments. It must be borne in mind that clinical skills must be based upon biological knowledge.

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