

## **THE IMPORTANCE OF THE SURGICAL APPROACH IN THE TREATMENT OF ODONTOGENIC INFECTIONS: CASE REPORT**

### **Renan Cabral Farah Paixão**

Dentistry student at the Universidade Iguaçu, Nova Iguaçu, RJ, Brazil.

### **Antônio Marcos Pantoja de Azevedo**

Oral and Maxillofacial Surgery at Hospital Municipal Doutor Moacyr Rodrigues do Carmo, Duque de Caxias, RJ, Brazil.

### **Renata Gueldini**

Oral and Maxillofacial Surgery at Hospital Municipal Pedro II, Rio de Janeiro, RJ, Brazil.

### **Ney Medeiros Pinto Junior**

Oral and Maxillofacial Surgery at Hospital Municipal Miguel Couto, Rio de Janeiro, RJ, Brazil.

### **Suelen Cristina Sartoretto**

Oral Surgery at Universidade Iguaçu, Nova Iguaçu, RJ, Brazil.

### **Marcelo José Uzeda**

Oral Surgery at Universidade Iguaçu, Nova Iguaçu, RJ, Brazil.

### **Rodrigo Figueiredo de Brito Resende**

Oral Surgery at Universidade Iguaçu, Nova Iguaçu, RJ, Brazil.

**Institution in which the work was carried out:** Universidade Iguaçu, Nova Iguaçu, RJ, Brazil e Hospital Municipal Miguel Couto, Rio de Janeiro, RJ, Brazil

**Category:** Case Report

Renan Cabral Farah Paixão

Abílio Augusto Távora Avenue, 2134, Nova Iguaçu - RJ, Brazil - 26260-045

renancabralfp@gmail.com

## ABSTRACT

Complex odontogenic infections can occur at any age, regardless of gender or social class. This type of complication has two origins: the first due to pulp necrosis with bacterial invasion to the periapical tissue and the second, due to a deep periodontal pocket. A complex odontogenic infection is characterized by its greater potential for dissemination among facial spaces, generating risk to the patient's life. In these cases, complementary exams, such as laboratory and imaging tests, are indispensable for a correct diagnosis and treatment conduct. In addition to an aggressive and intense clinical and surgical treatment, aiming at the patient's well-being. The objective of this work is to report a clinical case of complex odontogenic infection, in a leukoderma patient, male, 28 years old and without systemic involvement. The treatment performed was under general anesthesia, where the professional opted for tooth extraction, surgical drainage of the region with the installation of drains and the use of antibiotics. There were no complications during the surgical procedure and it did not show any changes during the 14 - day postoperative control.

**Key word:** Odontogenic Infection; Dentistry; Oral surgery.

## INTRODUCTION

Odontogenic infections can have two origins, the first resulting from pulp necrosis with bacterial invasion of periapical tissues and the second being through a deep periodontal pocket, which allows inoculation in adjacent tissues by present bacteria (CORTEZZI 1995; ANDRADE, 2014; HUPP JR, ET AL, 2019). A complex odontogenic infection is characterized by its potential for dissemination through facial spaces, thus generating complications for the patient and although infrequently, leading the patient to death. Therefore, these types of patients should be treated as an urgency or emergency and through immediate intervention. (JARDIN ECG, ET AL, 2011; LIMA FGGP, ET AL, 2018; ULUIBAU IC, ET AL, 2005)

To determine the severity of the infection, it is necessary to perform a clinical examination in order to observe the typical signs of inflammation: heat, pain, redness, tumor and loss of function. Being the most common complaint of these patients in ascending order: pain, tumor and heat at the injury site. After verifying these signs in the physical examination, the professional should assess vital signs at this first moment, which includes temperature, blood pressure, heart rate and respiratory rate, in addition to considering the degree of time / space orientation, and should be evaluated periodically

by the professional, as it will serve as a parameter in the patient's evolution. (CORTEZZI 1995; ANDRADE, 2014; HUPP JR, ET AL, 2019)

Imaging exams are of fundamental importance for assessing the involvement of spaces that may be affected, being an example of these radiographic exams such as periapical radiography, chest, cervical profile and panoramic and / or tomographic examination of the face, chest and cervical region. Computed tomography has become a very useful resource for assessing the head and neck region, as it allows the identification of the pathological process and allows its reconstruction in three dimensions, thus helping to assemble the treatment plan. Laboratory tests should be requested for the assessment of white blood cells, red blood cells, blood glucose, urine, urea and creatine, as these data will assist in the observation of the degree of systemic impairment and the consequent determination of the most appropriate therapeutic approach. (CORTEZZI 1995; JARDIN ECG, ET AL, 2011, RODRIGUES AF, VITRAL RWF, 2007)

The treatment of these infections occurs through the combination of surgical technique and antibiotic therapy. It is already known that the microbiota present in infections is of mixed flora, and antibiotic therapy is fundamental to prevent the invasion of adjacent spaces and containing the infection, but only with the correct use, bearing in mind that the use of inappropriate antibiotics can generate resistance to even making the treatment difficult, also only its use does not end the infection, only in conjunction with the removal of the cause the infection can end, so the use of antibiotics should be used concomitantly with the surgical technique, to remove the cause, the technique surgery in severe odontogenic infections, consists of a large incision in the affected area, with aggressive exploration with hemostatic forceps of the involved facial spaces, then the placement of one or more drains should be done to provide adequate drainage and decompression of the affected area, as the incision and drainage must be extensive, it is recommended that the procedure be done in hospital with the op patient under general anesthesia. (CORTEZZI 1995; HUPP JR, ET AL, 2019)

## **CASE REPORT**

Patient M.E.C., leucoderma, male, 28 years old, lucid and oriented in time and space, was admitted to the emergency service of the Municipal Hospital Miguel Couto, Rio de Janeiro, RJ, Brazil, presenting an increase in volume in the left hemiface, dysphagia, generalized pain, limited mouth opening, dyspnoea, eyelid occlusion and high fever that only remits with the use of antipyretics every four hours. The patient was referred to the Oral and Maxillofacial Surgery Service for the assessment and management of the case. **(Figure 1 A, B and C)**

In targeted anamnesis, no underlying disease was reported, he denied allergies and continued use of medications or hospitalization in recent years. It was reported to the professional that he had not eaten for about 24 hours and that the pain followed by the beginning of the increase in volume had already taken place for 3 days. The patient started using Amoxicillin 500 mg every 8 hours on his own the previous day, already on the third dose of this drug, but he did not report any improvement. On physical examination, the presence of extensive caries lesion in dental element 26 was seen, with pulp necrosis and great destruction of the dental element. In addition, there was invasion of the oral facial space on the left side, rigid swelling on palpation, hyperemia and local heat. In measuring his vital signs, the patient had blood pressure 120 X 90 mm / Hg, respiratory rate 35 rpm, heart rate 102 bpm and temperature 39.5°C.

Complementary exams were requested to assess their systemic status and to visualize the infection site. In face, cervical and chest computed tomography, with contrast, the presence of secretion was confirmed only in the buccal space on the left side, in addition to visualization of normality in the cervical and thoracic region.

Laboratory tests such as complete blood count, complete coagulogram and blood biochemistry (glucose, urea and creatinine) were requested. In the first, it was possible to observe a deviation to the left with leukocytes in 16200 mm<sup>3</sup>, with sticks 12% and segmented 75%, thus confirming that it was an acute infection. The other tests ordered had rates within the normal clinical standards.

Intravenous antibiotic therapy with Clindamycin 600 mg every 6 hours was started intravenously (IV) and the two-hour period was waited for the surgery to start, as the patient had ingested liquid at about 4 hours. With the patient undergoing general anesthesia, surgical field antiseptics was performed with 0.12% chlorhexidine (Periogard<sup>®</sup>, Colgate, Rio de Janeiro, RJ, Brazil) and in a dermis region with 2% chlorhexidine soap (Riohex<sup>®</sup>, Riohex, Rio de Janeiro, RJ, Brazil), followed by the

installation of sterile surgical drapes. After 10 minutes, an intra-sulcular incision was made from the mesial region of the dental element 25 to the distal one of the element 27 using a scalpel no. 3 (SS White Duflex<sup>®</sup>, Rio de Janeiro / RJ, Brazil) and a 15C surgical blade (Solidor, Diadema, SP, Brazil), followed by mucoperiosteal detachment using Molt detacher type 9 (SS White Duflex<sup>®</sup>, Rio de Janeiro / RJ, Brazil) to visualize the bone structures of the region. Then, the professional started ostectomy with a spherical drill n°6 (Harte<sup>®</sup>, São Paulo, SP, Brazil) in the buccal and distal regions, in addition to making a support through the mesial to position his straight lever (Apexo<sup>®</sup>, Quinelato, Rio de Janeiro, RJ, Brazil) and odontosection with drill no. 702 (Harte<sup>®</sup>, São Paulo, SP, Brazil) for root division. After this stage, the surgical expansion of the alveolus began with the use of the straight lever and removal using forceps n° 65.

After this stage, an incision at the bottom of the vestibule of about 4 cm was made for dissection with Metzenbaum scissors (SS White Duflex<sup>®</sup>, Rio de Janeiro / RJ, Brazil) and penetration into the oral space for effective purulent drainage in the region. The space was abundantly irrigated with 250 mL of sterile 0.9% saline solution (Med Flex<sup>®</sup>, Eurofarma, São Paulo, SP, Brazil) coupled to a pink 40X12 needle (Descarpack<sup>®</sup>, São Paulo, SP, Brazil), followed by the installation of a Pen rose drain n°1 (Waltex<sup>®</sup>, São Paulo, SP, Brazil), sutured with 4-0 silk thread (Sertix<sup>®</sup>, Shalon, São Paulo, SP, Brazil). **(Figure 2 A and B)** Then the socket in the region of the dental element 26, was sutured with the same thread with a type “8” suture.

After extubation, he was taken to post - anesthetic rest (RPA), where he remained for 120 minutes, being referred to the ward of the Oral Surgery and Traumatology service.

As a postoperative prescription, the use of Clindamycin (EV) as administered in the preoperative period was maintained, in addition to Tenoxican 20 mg every 12 hours for 02 days (EV), Dipyron Monohydrate 2ml every 4 hours for 2 hours days (EV), 0.12% chlorhexidine (Periogard<sup>®</sup>, Colgate, Rio de Janeiro, RJ, Brazil) every 12 hours by mouth. As specific care, the nursing service was instructed to use warm water compresses 04 times a day in the region, where pasty petroleum jelly was applied, the head elevated 30° and the occlusive and compressive dressing changed every 12 hours.

The patient's evaluation was performed daily through clinical examination. On the fifth postoperative day, the patient underwent laboratory tests (same as in the preoperative period), which were already within normal rates. In addition, he already had a normal mouth opening and was able to eat normally. In measuring his vital signs, the patient had

blood pressure 120 X 90 mm / Hg, respiratory rate 18 rpm, heart rate 70 bpm and temperature 36.6°C. **(Figure 3 A, B and C)** Thus, he was discharged from hospital with control through the outpatient service. He did not show any changes during the 7 and 14 days postoperative control, being released by the specialty and sent to the Dentistry service of the municipal network of Duque de Caxias / RJ for treatment, thus avoiding new cases of odontogenic infection.



**Figure 1:** Front view of the patient, when he entered the emergency department of the hospital.



**Figure 2:** Surgical procedure performed under general anesthesia for drainage, removal of dental element N° 26 and installation of a Pen Rose drain N° 1.



**Figure 3:** Front view of the patient after the 5th postoperative day.

## DISCUSSION

As we can see in this case reported in the article, complex odontogenic infections can occur at any age and regardless of the sex of the patients. Its dissemination occurs through deep facial spaces (primary and / or secondary), these spaces being tissue compartments filled with loose areolar connective tissue and covered by fascials, but not present in healthy patients. (CORTEZZI 1995; HUPP JR, ET AL, 2008). The spaces mainly affected by infection in the upper teeth are the spaces, infraorbital, palatal space and oral space, in which the oral space was affected in this infection, the correct and rapid diagnosis being extremely important, in order to avoid a large infectious condition, where the infection spreads to deeper spaces, generating life threats to the patient.

In accordance with the literature, in this case, complementary imaging and laboratory tests were requested for diagnostic assistance. In this first, computed tomography, always with intravenous contrast is requested, since it makes the identification and location of the infection and its involved spaces adequately. This examination provides the professional with findings such as cellulite involving soft tissues, correlations with fluids in the region and abscess formation, thus providing indispensable assistance for the identification of the causative tooth and spaces that have been affected. In the reported case, only the oral space on the left side was affected, with no involvement of the cervical and thoracic regions. (CORTEZZI 1995; HUPP JR, ET AL, 2008; JARDIN ECG, ET AL, 2011; LIMA FGGP, ET AL, 2018; CARMAGOS FM, ET AL, 2016; RODRIGUES AF, ELLER MML, ET AL, 2018; VITRAL RWF, 2007)

In addition to tomography, it is necessary to have laboratory tests, which are the responsibility of the dental surgeon, to request according to the ordinance of the Ministry of Labor and Employment No. 397 of 2002 and normative summary number 11. It is important to know how to indicate them properly, so that there is no complication, arising from any systemic problem that the patient has, and in cases of odontogenic infection, allow us to observe the changes that indicate its presence. For the correct evaluation of infections, it is necessary to evaluate the rates of white blood cells, red blood cells, glucose, creatine and urea.

The first item of the analyzed blood count should be the erythrogram, whose function is to report changes in the erythrocytes (erythrocytes), helping in the diagnosis for a possible anemia or polycythemia of the patient. In the reported case, the patient did not present any changes. Then, the leukogram must be analyzed, which is responsible for the quantitative and qualitative analysis of the leukocytes. These are the body's defense cells, where individual and differential counting of the five types of leukocytes present in the blood (Neutrophils, eosinophils, basophils, and agranulocytes: lymphocytes and monocytes) is performed and where it is diagnosed if we are facing an infection, which can be chronic or acute. The patient had what we call a left shift, due to his high rate of leukocytes in 16200 mm<sup>3</sup>, rods 12% and segmented 75%, with this change it was possible to confirm that it was an acute infection. (AMARAL, COF; ET AL., 2014)

The complete coagulogram of the patient should also be requested as a laboratory test. It consists of bleeding time, clotting time, prothrombin time activated, prothrombin time partially activated, index of international and platelet normalization. This analysis of possible coagulation disorders present is performed in order to avoid possible complications during the surgical procedure. In this examination, the patient did not show any change in his values. Finally, the blood biochemistry (glucose, creatine and urea) was analyzed, where this exam observes some systemic changes such as diabetes mellitus, kidney and / or liver disorders that may interfere with the procedure and in the choice of therapeutic options. (AMARAL, COF; ET AL., 2014)

For the treatment of infections regardless of whether they are mild or severe, there are five general goals, these are the medical support of the patient, aiming to protect the airways and protect the patient's compromised defenses, surgical removal as early as possible from the source of infection, surgical drainage of the infection using appropriate



drains, administration of antibiotics correctly and the ultimate goal is to reassess the patient. (HUPP JR, ET AL, 2008)

A great auxiliary factor to this treatment is antibiotic therapy, which is of utmost importance to be used in the treatment of these infections, since in the pre-antibiotic therapy era, odontogenic infections had a death rate of approximately 10 to 40 percent, but over time the its misuse is generating a return of infections by resistant bacteria (ULUIBAU IC, ET AL, 2005). The antibiotic for the treatment of infections must have ideal characteristics as an activity against the organism of the infectious process, with good penetration and diffusion in the place of the infection, in addition to few adverse effects and good tolerance. (TORTAMANO IP ET AL, 2008)

The bacteria predominantly present in odontogenic infections are Streptococcus, Peptostreptococcus, Veillonella, Lactobacillus and Actinomyces (HUPP JR, ET AL, 2008; TORTAMANO IP ET AL, 2008; SANDOR GKB, ET AL, 2020; BAHL R, ET AL, 2014). Then antibiotics are the base of penicillin the most suitable for the treatment of odontogenic infections, highlighting: Amoxiline, Amoxiline associated with clavulanic acid, Metronidazole, Clindamycin or Azithromycin. Isolated or in association. The combination with Amoxiline to acquire coverage against gram positive aerobic bacteria, if the patient is allergic to penicillin or the bacteria are resistant, Clindamycin should be used, as it has a good spectrum of action and good clinical efficacy. In the case reported, as the patient used Amoxicillin 500 mg every 8 hours, being in his third dose and without improvement, the medication was switched to Clindamycin 600 mg every 6 hours intravenously, with clindamycin administered intravenously to avoid complications such as airway sealing. (ELLER MML, ET AL, 2018; TORTAMANO IP ET AL, 2008; SANDOR GKB, ET AL, 2020; BAHL R, ET AL, 2014)

## **FINAL CONSIDERATIONS**

Complex odontogenic infections are characterized by spreading in primary and / or secondary facial spaces and are life-threatening, due to some complications such as airway obstruction, mediastinitis and thrombosis of the cavernous sinus.

As noted in the exposed case, in order to be successful in the treatment of odontogenic infections characterized as severe, an experienced Buco-Maxillofacial surgeon should be conducted, requiring removal of the cause, drainage of the involved

spaces, installation of drains and adequate antibiotic therapy. In addition, it is essential to make a correct diagnosis through a rigorous clinical examination associated with complementary quality tests.

## REFERÊNCIAS BIBLIOGRÁFICAS

1. Hupp JR, Edward E, Tucker MR. Contemporary oral and maxillofacial surgery . 7<sup>o</sup> ed. Rio de Janeiro: Elsevier Editora, 2019.
2. Andrade, E. D. Terapêutica Medicamentosa em Odontologia - Artes Médicas, 3<sup>a</sup> Ed., 2014;
3. Cortezzi, W. Infecção odontogênica oral e maxilofacial. 1<sup>o</sup> ed Rio de Janeiro; Pedro Pimeiro, 1995.
4. Jardim ECG, et al. Infecções odontogênicas: relato de caso e implicações terapêuticas. Revista Odontológica de Araçatuba, V.32, n.1, P. 40-43, Janeiro/Junho, 2011.
5. Lima FGGP, Rios LGC, Cunha LTMQ, Rocha FS, Batista JD. Abordagem clínico-cirúrgica de infecção complexa em região maxilo-facial: relato de caso. Rev Odonto Bras Central 2018: 112-116.
6. Carmagos FM, et al. Infecções odontogênicas complexas e seu perfil epidemiológico. Rev Cir. Traumatol. Buco-maxilo-Fac., Camaragibe, v.16, n.2, p.25-30, Abr/Jun. 2016.
7. Uluibau IC, Jaunay T, Goss NA. Severe odontogenic infections. Australian dental Journal medications supplement 2005;50;4
8. Eller MML, et al. Infecções odontogênicas e sua relação com a resposta imunológica. II Jornada de iniciação científica da FACIG, Nov. 2018
9. Rodrigues AF, Vitral RWF. Aplicações da tomografia computadorizada na odontologia. Pesquisa Brasileira em Odontopediatria e Clínica Integrada, vol. 7, núm. 3, setembro-dezembro, 2007, pp. 317-324.
10. Tortamano IP, Horliana ACRT, Costa CG, Romano MM, Soares MS, Rocha RG. Antibioticoterapia no tratamento de abscessos periapicais agudos: quando indicar e como proceder?. São Bernardo do Campo SP. Revista odonto, ano 16, n,32, Jul/ Dez. 2008.

11. Sandor GKB, Low DE, Judd PL, Davidson RJ. Antimicrobial treatment options in the management of odontogenic infections. <http://www.cda-adc.ca/jcda/vol-64/issue-7/antimicrobial-t.html>, visto em: 28 de março de 2020.

12. Bahl R, Sandhu S, Singh K, Sahai N, Gupta M. Odontogenic infections: microbiology and management. *Contemp clin dente*. 2014, Jul/Sep; 5(3): 307-311

13. Amaral, COF; et al. Bases para Interpretação de Exames Laboratoriais na Prática Odontológica. *UNOPAR Cient Ciênc Biol Saúde* 2014;16(3):229-37