Benedito Rodrigues da Silva Neto
(Organizador)

Prevenção e Promoção de Saúde 6

Atena Editora
Ano 2019

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Editora Chefe: Profª Drª Antonella Carvalho de Oliveira
Diagramação: Natália Sandrini
Edição de Arte: Lorena Prestes
Revisão: Os Autores

Atena Editora
Ano 2019

Dados Internacionais de Catalogação na Publicação (CIP)
(eDOC BRASIL, Belo Horizonte/MG)

P944 Prevenção e promoção de saúde 6 [recurso eletrônico] / Organizador Benedito Rodrigues da Silva Neto. – Ponta Grossa, PR: Atena Editora, 2019. – (Prevenção e promoção de saúde; v. 6)

Formato: PDF
Requisitos de sistema: Adobe Acrobat Reader
Modo de acesso: World Wide Web
Inclui bibliografia
ISBN 978-85-7247-838-0
DOI 10.22533/at.ed.380191812

1. Política de saúde. 2. Saúde pública. I. Silva Neto, Benedito Rodrigues da. II. Série.

CDD 362.1

Elaborado por Maurício Amormino Júnior – CRB6/2422

Atena Editora
Ponta Grossa – Paraná - Brasil
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Atena Editora
Ano 2019

APRESENTAÇÃO

A coleção “Prevenção e Promoção de Saúde” é uma obra composta de onze volumes que apresenta de forma multidisciplinar artigos e trabalhos desenvolvidos em todo o território nacional estruturados de forma a oferecer ao leitor conhecimentos nos diversos campos da prevenção como educação, epidemiologia e novas tecnologias, assim como no aspecto da promoção à saúde girando em torno da saúde física e mental, das pesquisas básicas e das áreas fundamentais da promoção tais como a medicina, enfermagem dentre outras.

Neste volume de maneira especial agregamos trabalhos desenvolvidos com a metodologia da revisão bibliográfica e estudos de casos, uma ferramenta essencial para consolidar conhecimentos específicos na área da saúde. Em tempos de avalanche de informação, revisões fundamentadas e sistematizadas são essenciais para consolidar o conhecimento.

Deste modo, o sexto volume da obra, aborda trabalhos de revisões com temáticas multidisciplinares e estudos de casos tais como, Educação em saúde, Doenças Ocupacionais, Atenção Básica, Qualidade de vida, Terapia Ocupacional, Contenção de Riscos Biológicos, Indicadores de Morbimortalidade, Emergências, Nutrição, Trauma torácico, Gestão de Leitos, Violência Intrafamiliar, Terapias Complementares, Segurança do paciente; Fibrilação Atrial, Iniciação científica e outros temas interdisciplinares.

Deste modo, a coleção “Prevenção e Promoção de Saúde” apresenta uma teoria bem fundamentada seja nas revisões, estudos de caso ou nos resultados práticos obtidos pelos pesquisadores, técnicos, docentes e discentes que desenvolveram seus trabalhos aqui apresentados. Ressaltamos mais uma vez o quão importante é a divulgação científica para o avanço da educação, e a Atena Editora torna esse processo acessível oferecendo uma plataforma consolidada e confiável para que diversos pesquisadores exponham e divulguem seus resultados.

Benedito Rodrigues da Silva Neto

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CAPÍTULO 23

OSTEONECROSE DOS MAXILARES ASSOCIADA AOS BIFOSFANATOS

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RESUMO: A associação entre o uso de bisfosfonatos (análogos sintéticos do pirofosfato) e o desenvolvimento subsequente de necrose dos ossos gnáticos foi relatada, inicialmente, por Marx, em 2003. Utilizado para o tratamento da hipercalcemia, induzida por tumor, na dor óssea, na redução de complicações esqueléticas em pacientes com metástases ósseas ou mielomamúltiplo e osteoporose pós-menopausa. É necessário cuidado e atenção quando da implementação do uso destes medicamentos, considerando o desenvolvimento de osteonecrose, ou seja, incapacidade do tecido ósseo afetado em reparar e se remodelar frente a quadros inflamatórios desencadeados por estresse mecânico (mastigação), exodontias, irritações por próteses ou infecção dental e periodontal,

em indivíduos com história prévia de tratamento utilizando bifosfonatos nitrogenados, ou outros medicamentos antirreabsortivos ou antiangiogênicos, que não apresentam metástase oral e nunca realizaram radioterapia nos maxilares. O desenvolvimento da osteonecrose não depende apenas da dose cumulativa, mas também da potência do medicamento, bem como do grau de inibição da remodelação óssea. Caracterizado por necrose, dor e infecção óssea, ainda não há consenso na literatura acerca do melhor tratamento; mas, é necessário considerar o uso do laser, que parece promissor. O manejo de pacientes com quadro de osteonecrose dos maxilares é complexo, envolve a equipe multiprofissional e mais estudos são necessários, na elaboração de condutas e protocolos terapêuticos para esses pacientes.
PALAVRAS-CHAVE: Osteonecrose, Maxila, Mandíbula, Bisfosfonatos.

OSTEONECROSIS OF THE JAWS ASSOCIATED WITH BIPHOSPHOSNATES

ABSTRACT: The association between the use of bisphosphonates (synthetic pyrophosphate analogs) and the subsequent development of gnatic bone necrosis was reported by Marx in 2003. Used for the treatment of tumor-induced hypercalcemia in bone pain, in reducing skeletal complications in patients with bone metastases or myeloma multiple and postmenopausal osteoporosis. Care and attention is required when implementing the use of these medications, considering the development of osteonecrosis, that is, inability of the affected bone tissue to repair and remodel in the presence of inflammatory conditions triggered by mechanical stress (chewing), tooth extraction, denture irritation or dental and periodontal infection in individuals with a previous history of treatment using nitrogen bisphosphonates, or other medications anti-resorptive or antiangiogenic drugs, which do not have oral metastasis and have never had radiotherapy. The development of osteonecrosis depends not only on the cumulative dose, but also on the potency of the drug as well as the degree of inhibition of bone remodeling. Characterized by necrosis, pain and bone infection, there is still no consensus in the literature about the best treatment; But it is necessary to consider the use of the laser, which looks promising. The management of patients with osteonecrosis of the jaws is complex, involves the multiprofessional team and more studies are needed in the development of therapeutic procedures and protocols for these patients.
KEYWORDS: Osteonecrosis, Maxilla, Mandible, Bisphosphonates.

1 I INTRODUCTION

Dental surgeons' knowledge of drug indications, possible relationships with other drugs, and side effects is of paramount importance to their clinical practice. Bisphosphanates (BPs) are an effective osteoclast-mediated bone resorption inhibitor

group and can be used for the treatment of bone metastases, multiple myeloma, paget's disease, calcium metabolism disease control, as well as the treatment and prevention of osteoporosis and osteopenia (BROZOSKI et al., 2012; YANG et al., 2019).

BPs are pyrophosphate-like drugs that inhibit bone resorption by interfering with osteoclastic activation and promoting osteoclast apoptosis. When used as pharmacological agents, BFs have fundamental biological effects on calcium metabolism, inhibiting calcification. They act through two mechanisms of action related to antiosteoclastic and antiangiogenic activity. Plasma half-life of BFs is approximately 10 years, and prolonged use can result in substantial drug accumulation in bone. (BROZOSKI et al., 2012; GAVALGÁ & BAGAN, 2016; YANG et al., 2019).

However, the use of BPs and other anti-resorptive drugs may produce adverse effects on the jaw bones, structures of interest to the dentist, a complication called jaw osteonecrosis (ONJ). This is defined as an area of exposed or necrotic bone that has not healed within 8 weeks in patients receiving BP treatment, ruling out radiotherapy on the affected bones. The pathogenesis of ONJ remains uncertain, although suppression of osteoclast-mediated bone remodeling with consequent bone sclerosis and ischemia has been suggested as the probable causal mechanism (GAVALGÁ & BAGAN, 2016).

The risk factors associated with ONJ are various. They can be considered systemic (underlying primary disease, diabetes, corticosteroid use, chemotherapy, duration and dosage of anti-resorptive and antiangiogenic use) and local (bone manipulation, periodontal disease, endodontic lesions) (SOARES et al., 2019). Therefore, attention is required during the anamnesis and better decision of clinical management in this group of patients.

A ONJ has a major impact on the quality of life of those who present it, as it may be associated with pain, feeding difficulty and foul odor. In 2015, an updated article from the American Association of Oral and Maxillofacial Surgeons (AAOMS) recommended altering the term jaw osteonecrosis (ONJ) by drug-related jaw osteonecrosis (MRONM) due to increased cases of bone necrosis associated with other drugs (KHAN et al., 2015; SOARES et al., 2019).

Regarding the therapeutic approach to osteonecrosis, it depends on many variables such as age, gender, disease stage, lesion size, presence of comorbidities, drug exposure, among others. Other important factors are prognosis, quality of life and expectation and ability of an individual to cope with the disease (MÉNEA et al., 2018).

Thus, the dentist should be able to act in the prevention, diagnosis and rehabilitation of patients with jaw osteonecrosis. The importance of drug knowledge and its relationship with other drugs guides the clinical practice of good health

professionals. From this, this article aims to present a literature review on jaw osteonecrosis associated with bisphosphanates and their particularities in dentistry. A literature study was conducted with selection of available articles in the database systems: Medlars on line International Literature (Medline), Latin American and Caribbean Health Sciences Literature (Lilacs) and Virtual Health Library (VHL). The following descriptors were used: osteonecrosis, maxilla, mandible and bisphosphonates. A critical reading and thematic content analysis were performed as can be observed below.

2 I LITERATURE REVIEW

With the advancement of treatments for patients with osteolytic diseases or cancer with great power of bone metastasis, bisphosphonates, synthetic substances of inorganic pyrophosphate, that resemble natural polyphosphates, whose chemical characteristics determine the power of adherence to hydroxyapatite were created (POUBEL et al., 2012).

Bisphosphonates are potent inhibitors of osteoclast-mediated bone resorption. When deposited on the bone surface, they are internationalized by osteoclasts causing inhibition of bone resorption. In addition, they have antitumor effects and antiangiogenic activity, resulting in decreased endothelial growth factor levels (MORAIS; SILVA, 2015). These drugs are effective in reducing serum calcium in patients with malignant hypercalcemia, as well as in the treatment of bone pain, osteoporosis and bone metastases (MARQUES, 2015).

The initial association between bisphosphonate use and subsequent development of gnatic bone necrosis was reported by Marx in 2003. He described 36 cases, 80.5% in the mandible, 14% in the maxilla and 5.5% in both. jaws. All affected individuals used intravenous medication being pamidronate or zolendronate. And in 28 of these patients the clinical appearance was preceded by extraction. Since then, relevant research has reported incidences greater than or equal to 10% of bone necrosis associated with intravenous bisphosphonates (4). It is currently known that osteonecrosis may also result from the use of bone remodeling and antiangiogenesis drugs (RIBOEIRA, 2018)

The incorporation of these drugs is greater in areas of bone remodeling, such as the jaw bones. Although the vast majority of osteonecrosis cases have occurred in the jaws, extramaxillary involvement has been reported, as described by Agarwala 2002 (NEVILLE, 2009; AGARWALA, 2002).

2.1 Definition

Osteonecrosis is defined as the presence of necrotic bone exposed in the maxillofacial region that does not heal within eight weeks of clinical identification; in a patient with a previous history of treatment using nitrogen bisphosphonates, or other anti-resorptive or anti-angiogenic drugs, who did not present oral metastasis and never underwent radiotherapy on the jaws (POUBEL, 2012; MOURÃO, MOURA, MANSO, 2013).

Still, according to Martins et al. (2009), is the inability of the affected bone tissue to repair and remodeling against inflammatory conditions triggered by mechanical stress (chewing), tooth extraction, prosthesis irritation or dental and periodontal infection (MARTINS 2009).

2.2 Pathogenesis

Bone, although it seems stable, is a dynamic tissue in constant remodeling. This process is essential for maintaining the bone quality and quantity of an adult individual. It occurs through multicellular activities, but essentially by osteoblasts and osteoclasts. When this process is interrupted, changes such as osteonecrosis set in (SILVA, 2015). Regarding the pathogenesis of bisphosphonate-associated osteonecrosis (OAB), as related to other drugs, some hypotheses are defined, but the most accepted are: the direct action on osteoclasts that leads to a significant decrease in bone remodeling; and inhibition of vascular endothelial growth factor (MOURÃO, MOURA, MANSO, 2013).

2.3 Clinical and Radiographic Aspects

Some studies have shown that bisphosphonate-associated osteonecrosis appears to be more closely related to intravenous bisphosphonate use for a period longer than three years. It is also noticeable that its development depends not only on the cumulative dose, but also on their potency, as well as the degree of inhibition of bone remodeling (MOURÃO, MOURA, MANSO, 2013).

According to Gegler 2006, Bisphosphonates can be divided into three generations: The first generation includes etidronate, the second comprises aminobisphosphonates, such as alendronate and pamidronate, and the third generation has a cyclic chain, with risedronate and zoledronate as their representatives. Bisphosphonate's anti-absorptive properties increase approximately tenfold between generations of the drug.

Risk factors for its development include advanced patient age, corticosteroid use, chemotherapy drug use, diabetes, smoking or alcohol use, poor oral hygiene, and drug use for more than 3 years. Although a mandibular predominance has

been noted, involvement of the maxilla or both maxillary bones is not uncommon (NEVILLE, 2009).

Regarding its clinical aspect, it may present necrotic bone exposure with or without associated pain, inflammation in adjacent tissues and suppuration (MOURÃO, MOURA, MANSO, 2013). It has been suggested that bone at imminent risk for osteonecrosis tends to demonstrate increased radiopacity prior to clinical evidence of overt necrosis. In the most severe cases, osteonecrosis generates a poorly defined radiolucent moth-biting image with or without central radiopaque sequestration. In some cases, necrosis may lead to the development of skin fistulas or pathological fracture (NEVILLE, 2009).

The American Association of Oral and Maxillofacial Surgeons (AAOMS) has established a classification for osteonecrosis from diagnosis: stage 0 - no necrotic apparent bone but clinical signs and nonspecific symptoms and radiographic changes; stage 1- presents necrotic bone without signs and symptoms of infection; Stage 2 - presents with necrotic bone, infection, symptomatic erythematous areas, with or without purulent drainage; Stage 3- presents necrotic bone with pain, infection, and one or more of the following factors: extension beyond the initially involved region, extraoral fistula, nasal communication, or osteolysis extending from the lower jaw and sinus floor (SILVA, 2015).

2.4 Treatment

The treatment of osteonecrosis is still a challenge for the clinician. Currently, it seems consensus that osteonecrosis should be initially conservatively managed by debridement and cleaning of the surgical wound with antimicrobial solutions, antibiotic therapy and minor surgery (sequestrectomy) (POUBEL, 2012; MOURÃO, MOURA, MANSO, 2013; RIBOEIRA, 2018).

In cases refractory to conservative treatment, hyperbaric oxygen therapy (HBO), the use of oxygen under high atmospheric pressure, associated or not with surgery, should be indicated. Oxygen administered at controlled doses and pressure ultimately promotes increased oxygen tension in the compromised area, vascular neoformation, increased cell number, increased cellular activity, is bacteriostatic and bactericidal, and increases collagenase (POUBEL, 2012; MOURÃO, MOURA, MANSO, 2013; RIBOEIRA, 2018).

This set provides adequate means for healing of injured tissues to occur. Surgery is reserved for persistent osteonecrosis and includes radical resection of the lesion (sequestrectomy, hemimandibulectomy, etc.) with reconstruction. Alternative treatment techniques for osteonecrosis have been studied. As the option of using two related drugs, pentoxifylline and tocopherol (Pento), this association becomes even more potent when combined with clodronate (Pentoclo) (MOURÃO, MOURA,

MANSO, 2013; RIBOEIRA, 2018).

In recent years, laser light has been used and tested in the treatment of various injuries. Favorable results were found in bone tissue, either in bone fracture repair, bone neoformation, or with proven biostimulating effect on osteoblasts and biomodulation of undifferentiated mesenchymal cells in osteoblasts and osteocytes. Its application in the treatment of osteonecrosis still needs studies (MOURÃO, MOURA, MANSO, 2013; RIBOEIRA, 2018).

2.5 Prevention

Performing the necessary dental treatment prior to the beginning of bisphosphonate therapy, oral hygiene instruction and rigorous clinical follow-up can provide patients with better quality of life and prevent the development of maxillary osteonecrosis (MARQUES, 2015)

Thus, patients who will undergo bisphosphonates or other osteonecrosis-associated drugs should be referred for dental evaluation (MORAES, SILVA 2015; MARQUES, 2015).

The evaluation should not only include a carefully and thoroughly performed clinical dental examination, but also the patient's medical history. Researching your past experiences as well as your dental history can help gauge your ability to follow a preventive oral care program. At this point the assessment of self-care capacity is essential (MORAES, SILVA 2015; MARQUES, 2015).

Thus, the objective of previous dental treatment will be to eliminate or stabilize oral conditions to minimize possible local and systemic infections. Patients should be evaluated before starting these medications, at which time all non-restorable teeth and / or teeth with advanced periodontal problems should be extracted to reduce the possibility of sequelae. Initial radiographic examination is essential to assess the presence of infectious foci, the presence and / or extent of periodontal disease, and especially the determination of metastatic disease (MORAES, SILVA, 2015; MARQUES, 2015).

3 I RESULTS AND DISCUSSION

The literature is unanimous in recognizing bisphosphonates as potent inhibitors of bone resorption and are widely used to treat different bone diseases or their complications, including osteoporosis, Paget's disease, Multiple Myeloma, Metastatic bone lesions associated with prostate câncer, breast cancer and other cancers, as well as osteogenesis imperfecta and idiopathic or steroid-induced juvenile osteoporosis. By reducing the speed of bone resorption, bisphosphonates are effective in preventing bone metastases and in reducing hypercalcemia caused

by malignant tumors (MORAES, SILVA, 2015; MARQUES, 2015; RIBOEIRA, 2018).

One of the most significant complications of bisphosphonate therapy is osteonecrosis, which was originally described by Marx in 2003. Dental extractions have been listed as the main triggering factor, however there are reports of osteonecrosis cases that apparently appear spontaneously (SILVA, 2015).

Chemotherapeutic agents and steroid use applied to cancer patients should also be considered as possible etiological agents, acting in synergy with bisphosphonates (POUBLE, 2012; MORAIS, SILVA 2015; MARQUES, 2015).

Little is known about the pathogenesis in the development of osteonecrosis by the continuous use of bisphosphonates. A study by Allen and Burr (2009) demonstrated the impediment in osteoclast activation by mediator cells. Over the osteocyte, there is a prolongation in the cellular life span, when small doses are employed and paradoxically rapid apoptosis with increasing dose.

Osteonecrosis is relatively common in the maxillary bones, as the site is often exposed to the external environment for extractions, major dental procedures and during oral hygiene. Some authors believe that this predilection is due to the fact that this is the only bone tissue subjected to continuous trauma to possible exposure to the environment through the gingival sulcus, justifying the high percentage of cases triggered by tooth extractions. The risk of osteonecrosis increases with dental manipulation and poor hygiene, so that by exposing the bone structure to the oral microbiota, the infection increases, producing significant pain, swelling, purulent discharge and very difficult progressive bone necrosis treated (POUBEL, 2012; RIBOEIRA, 2018; SILVA, 2015).

The better the oral condition of the patient undergoing bisphosphonate treatment, the better the prognosis is. However, often the patient and the attending physician are unaware of the possible oral repercussions that this class of medications may cause. And once the injury occurs, the dentist should use AAOMS-recommended measures to address the condition, such as antibiotic therapy, 0.12% chlorhexidine gluconate mouthwash, pain management, bone debridement when necessary, and infection prevention, as well as staying up to date on the new effective treatment options that emerge (RIBOEIRA, 2018; SILVA, 2015).

The interruption of bisphosphonate treatment by the Oncology team, due to the onset of osteonecrosis, does not show any impact on the duration or regression of the bone lesion, characterizing the high durability of the effects of the substance. Inhibition of new bone formation may affect bone quality during growth (POUBEL, 2012; RIBOEIRA, 2018; SILVA, 2015)

Regarding the treatment for osteonecrosis, it may vary according to the clinical manifestation, and the procedures are different for each stage. In stage 1, patients are treated using antimicrobial mouthwashes, periodic follow-up, and oral hygiene

instructions. In stage 2, the use of antimicrobial mouthwash combined with antibiotic therapy, pain control and superficial debridement to relieve soft tissue irritation and mild traumatic sequestrectomy is recommended. And at stage 3, debridement and sequestrectomy with antibiotic and analgesic therapy is recommended. Recently, it has been suggested that a surgically treated ONB patient may benefit from local infusion of autogenous platelet-rich plasma, which may possibly reduce the risk of local recurrences (RIBOEIRA, 2018; SILVA, 2015).

Even so, there is no consensus in the literature about the best protocol, but there are possibilities of treatments, such as debridement of the site, abundant saline irrigation, antibacterial and antiseptic therapy, and avoid pressure on the site. With regard to antibacterial therapy (ATB), the literature suggests prescribing penicillin associated with metranidazole or clindamycin until culture results are determined. If necessary, analgesics may be prescribed. The promotion of a balanced diet is advised, as well as smoking and alcohol cessation (VIDAL, 2012; BRENNAN, 2017; SROUSSI, 2017).

Although still controversial, hyperbaric oxygen therapy is recommended by some authors (5 sessions per week of 60-90 minutes for a total of 20-30 sessions with 100% oxygen in a pressurized environment at 2-3 atmospheres). This type of therapy aims to promote increased oxygenation of irradiated tissues, angiogenesis and the function of osteoblasts and fibroblasts. Clinical situations that do not respond to any of these therapies may require surgical removal of the necrotic bone with subsequent reconstructive surgery (VIDAL, 2012; BRENNAN, 2017; SROUSSI, 2017).

Thumbigere-Math et al. (2009) treated osteonecrosis with HBO (hyperbaric oxygen therapy) associated with ATB and extensive surgery, were successful in 25% of cases, while Freiberger et al. (2012) resolved 52% of cases by associating HBO exclusively with ATB. ATB associated platelet-rich plasma therapy has shown good results in patients undergoing surgical procedures, achieving a cure rate of over 80%. Unusual but effective, ozone therapy achieved a success rate of 60.6% and 100% in resolving 57 and 10 cases, respectively.

Another therapy that has been successful in combating osteonecrosis is LLLT (low power laser therapy). However, its action is more effective when combined with other therapeutic modalities, such as surgery, platelet-rich plasma and ATB or associated with non-surgical debridement, ATB and photodynamic therapy (PDT) (MOURÃO, MOURA, MANSO, 2013; RIBOEIRA, 2018; SILVA, 2015).

Thus, prevention through clinical and radiographic examinations, both by the oncologist and a dentist, before and during treatment with bisphosphonates, or other drugs associated with osteonecrosis, is the best inhibit such changes, especially when these drugs are administered intravenously (MOURÃO, MOURA, MANSO,

2013; RIBOEIRA, 2018; DOTTO, DOTTO, 2011).

Thus, it is essential that there is synergism between these health professionals, in order to inform the patient the risk-benefit of each procedure to be performed, as well as the possible complications of this treatment (MOURÃO, MOURA, MANSO, 2013; RIBOEIRA, 2018; DOTTO, DOTTO, 2011).

Treatment regimens should include patient education and awareness, routine oral care to reduce the risk of caries and periodontal disease, antibiotic and antimicrobial use, regular visits to the dentist for reevaluation and preservation, and elimination of related habits smoking and alcohol intake (MOURÃO, MOURA, MANSO, 2013; RIBOEIRA, 2018; DOTTO, DOTTO, 2011).

4 I CONCLUSION

It is consensus in the literature that the potency of each type of bisphosphonate; the type of administration; presence or absence of surgical trauma and poor oral hygiene are risk factors for the development of jaw osteonecrosis.

Thus, dental evaluation prior to treatment with the use of drugs such as bisphosphonates is recommended. It is necessary to favor communication between dentists and physicians, aiming to act preventively, early diagnosing and treating possible complications that may occur in the jaw bones.

The management of patients with osteonecrosis of the jaws is complex, involves the multiprofessional team and has been widely discussed in the literature. Further studies are needed in the elaboration of therapeutic conducts and protocols for these patients.

REFERENCES

AGARWALA, S.; et al**. Alendronate in the treatment of avascular necrosis of the hip**. Rheumatology. 2002; 41:346-7.

ALLEN, M.R.; BURR, D.B. **The pathogenesis of bisphosphonate-related osteonecrosis of the jaw: So many hiphoteses, so few data**. J Oral Maxillofac Surg 2009; 67:61-70

BRENNAN, M. T. et. al. **Dental disease prior to radiotherapy in head and neck cancer patients: clinical registry of dental outcomes in head and neck cancer patients (orarad).** J Am Dent Assoc. v. 148, n.12, p. 868–877, 2017.

BROZOSKI, M.A. et al. **Osteonecrose dos maxilares associada ao uso dos bifosfonatos**. Rev Bras Reumatol. v.52, n.2, p. 260-270, 2012.

DOTTO, M.L.; DOTTO, A.C. **Osteonecrose dos maxilares induzida por bisfosfonatos – revisão de literatura e relato de caso.** RFO, Passo Fundo, v. 16, n. 2, p. 229-233, maio/ago 2011.

FREIBERGER, J.J. et al. **What is the role of hyperbaric oxygen in the management of bisphosphonate-related osteonecrosis of the jaw: a randomized controlled trial of hyperbaric**

oxygen as an adjunct to surgery and antibiotics. J Oral Maxillofac Surg. 2012;70:1573-83.

GALVADÁ, C.; BAGAN, J.V. **Concept, diagnosis and classification of biphosphonate-associated osteonecrosis of the jaws. A review of the literature**. Med Oral Patol Oral Cir Bucal. V.21, n.3, p. 260-270, 2016.

GEGLER, A., et al**. Bisfosfonatos e osteonecrose maxilar: revisão de literatura e relato de dois casos**. Rev Bras Cancerol 2006; 52(1):25-31.

KHAN, A.A. et al**. Diagnosis and management of osteonecrosis of the jaw: a systematic review and international consensus**. J Bone Miner Res. v. 30, n.3. 2015.

MÂNEA, H.C. et al. **Biphosphonates-induced osteonecrosis of the jaw – epidemiological, clinical and histopathological aspects**. Rom J Morphol Embryol. V.59,n.3, p.825-831. 2018.

MARQUES, C. L. T. Q. et. al**. Oncologia: Uma abordagem Multidisciplinar**. Recife: Carpe Diem Edições e Produções Ltda, 2015.

MARTINS, M.A.T., et al. **Osteonecrose dos maxilares associada ao uso de bisfosfonatos: importante complicação do tratamento oncológico**. Rev Bras Hematol Hemoter 2009; 31(1):41-6.

MORAIS, M.T.; SILVA, A**. Fundamentos da Odontologia em Ambiente Hospitalar/UTI**. Rio de Janeiro: Elsevier, 2015; 1° edição, p. 104.

MOURÃO, C.F.A.B.; MOURA, A.P.; MANSO, J.E.F. **Tratamento da osteonecrose dos maxilares associada aos bifosfonatos: revisão da literatura.** Rev. Bras. Cir. Cabeça Pescoço, v.42, nº 2, p. 113-117, abril / maio / junho 2013

NEVILLE, B., et.al. **Patologia Oral e Maxilofacial**. Rio de Janeiro: Elsevier, 2009; 3° edição, p. 301-305.

POUBEL, V.L.N. et al**. Osteonecrose maxilo-mandibular induzida por bisfosfonato: revisão bibliográfica**. Rev. Cir. Traumatol. Buco-Maxilo-Fac., Camaragibe v.12, n.1, p. 33-42, jan./mar. 2012

RIBOEIRA, G.H. et al. **Osteonecrosis of the jaws: a review and update in etiology and treatment**. Braz J Otorhinolaryngol. 2018;84(1):102---108

SILVA, E.C.A. et al**. Osteonecrose dos maxilares associada ao uso de bisfosfonatos: Recidiva após radioterapia de cabeça e pescoço**. Rev Odontol Bras Central 2015;24(68)

SOARES, A.L. et al. **Prevalence and risk factors of medication –related osteonecrosis of the jaw in osteoporotic and breast cancer patients: a cross-sectional study**. Supportive care in cancer. 2019.

SROUSSI, H. Y. et. al**. Common oral complications of head and neck cancerradiation therapy: mucositis, infections, saliva change,fibrosis, sensory dysfunctions, dental caries, periodontaldisease, and osteoradionecrosis.** Cancer Medicine.v. 6, n. 12, p.2918–2931, 2017.

THUMBIGERE-MATH, V. et al. **Bisphosphonate-related osteonecrosis of the jaw: clinical features, risk factors, management, and treatment outcomes of 26 patients**. J Oral Maxillofac Surg. 2009;67:1904-13.

VIDAL, A. K. L. **Protocolo Operacional Padrão de Cuidados Buco-Dentais (POP- Oral) para indivíduos sob terapia antineoplásica.** Adaptado das Rotinas Internas do INCA (serviço de Odontologia). 2009. Nota Prévia (Original), 2012.

YANG, Y.L. et al. **The incidence and relative risk of adverse events in patients treated with bisphosphonate therapy for breast cancer: a systematic review and meta-analysis**. The Adv Med Oncol. v.11, 2019.

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Agência Brasileira do ISBN
ISBN 978-85-7247-838-0