Radiological manifestations of osteomyelitis in the head and neck

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Authors: P. J. D. G. Pereira, L. Duarte, M. D. S. Silva, M. kase, B. C. Olivetti, R. Murakoshi, M. D. O. sarpi, R. L. E. Gomes, E. M. M. S. GEBRIM; São Paulo/BR
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Learning objectives

The purposes of this educational exhibit are:

1. To review the main aspects of osteomyelitis in the head and neck (H&N) region, its causes and radiological manifestations.

2. To depict typical and atypical imaging characteristics on computed tomography (CT) and magnetic resonance imaging (MR) imaging through the presentation of illustrative cases from our digital archive of images.
Background

Osteomyelitis is defined as the inflammation of bone tissues due to infection, predominantly bacterial, but not exclusively of this aetiology.

In the head and neck (H&N) region this affection acquires great importance due to the abundant neuronal and vascular structures which have their trajectory near to the bones and through the foramens and canals of skull base, serving as a potential pathway for intracranial spread. The long-term involvement of those structures may course with definitive neural sequel or vascular complications.

Other complications implied to bone infection are pathologic fractures, bone destruction and even malignant transformation of the process. Moreover, craniofacial bones are really important concerning aesthetics, and their preservation is also an aim of the treatment.

The imaging foremost imaging modalities used to depict H&N osteomyelitis are CT, MR and scintigraphy. Rarely, conventional radiography (CR) and ultrasound (US) may have a role in the diagnosis.

We didactically divided our presentation considering the underlying condition that predisposed the occurrence of osteomyelitis. A section containing differential diagnosis is also included.
Findings and procedure details

The most sensitive and specific radiologic method for the diagnosis of osteomyelitis is MR imaging - review of the literature shows high sensitivity (72-100%) and specificity (75-96%). Findings can be detected as soon as 3-5 days after the onset of the symptoms. When compared to CT, MR shows worse spatial resolution, but remains more accurate. Plain radiography depicts bone alterations only in 1-2 weeks after the onset of the symptoms, with low sensitivity (43-75%) and specificity (75-83%).

Nuclear medicine may also contribute to the diagnosis, because it can early depict osteoclastic and osteoblastic activity (even when bone anatomic alterations are not very expressive). However, the rate of false positive is high, because other conditions can alter the normal bone radiotracer uptake (trauma, for example).

The bone contamination can be explained by three mechanisms:

- Contiguous spread of an infectious process; for instance, a patient with malignant (necrotizing) external otitis can develop osteomyelitis of the temporal bone as a complication of the initial pathology.
- Haematogenous seeding; this kind of contamination is important in patients with chronic systemic diseases, such as diabetes and HIV/AIDS.
- Direct inoculation; usually associated with trauma and surgical procedures.

The typical acute findings on CT and plain radiographies are related to bone destruction (Fig. 1). Patterns of bone loss characterized by serpiginous or branching images may occur. Frequently there are adjacent soft tissue swelling with post-contrast enhancement that can be associated with abscesses (Fig. 2), and gaseous intramedullary foci may be seen (Fig. 3). Periosteal reaction is very common, usually linear and dense (Fig. 3). On MR imaging, areas of acute osteomyelitis are characterized by low-signal intensity of the medullary bone on T1-weighted sequences. Usually, those areas are confluent, in contrast with a hazy reticulated pattern from bone reaction adjacent to soft tissue infection. On fluid-sensitive sequences, these areas present a high-signal intensity, which is a very sensitive finding. Contrast-enhanced images are important to depict the extension of the process and the presence of an abscess: usually we see diffuse enhancement of the inflammatory tissue and peripheral enhancement of abscesses (that also show restricted diffusion within).

The landmark of chronic osteomyelitis is the formation of sequestrum (Fig. 4), which is characterized by avascular bone islands, representing infected and devitalized bone tissue in variable sizes, better defined by CT in comparison to MR imaging. The Brodie’s abscess represents an intraosseous collection that may originate fistulas to the skin (Fig. 5). Involucrum is the name given to areas of new bone formation by periosteum,
in attempt to wall off the infection. Discontinuity of the involucrum is called cloaca and, when a cloaca drains purulent material to a skin fistula, it constitutes a sinus tract, a pathognomonic finding of osteomyelitis. MR studies are important to evaluate chronic osteomyelitis, because they can depict the presence of active inflammation, when the same pattern seen in acute processes is seen on chronic infection.

The majority of authors classify osteomyelitis in acute, subacute and chronic, depending on the imaging findings, clinical course, and disease duration. But, there is no total agreement about how this disease should be didactically divided. In our study, the cases were grouped in three sections, as follow, and a fourth section includes the differential diagnosis:

1. Osteomyelitis related to direct inoculation of the pathogen.
2. Osteomyelitis related to systemic diseases.
3. Osteomyelitis secondary to contiguous process.

1. Osteomyelitis related to direct inoculation of the pathogen

This is one of the most severe complications following trauma or surgical treatment (Fig. 6) and it accounts for 47% of the cases of osteomyelitis in general. Normally, this complication arises 1 to 3 weeks after the initial event and in 25% of all open fractures. It depends on the extension of soft tissue damage and impairment of blood supply, inoculation of bacterial agents, the instability of the fracture area and the general defensive condition of the organism. Patients with diabetes and other vascular diseases are more prone to develop osteomyelitis after trauma.

Post-traumatic osteomyelitis occurs via a different pathway when compared to haematogenous seeding, since it begins outside the bone cortex and it invades the underlying bone. Pathogens involved on those cases can come from the skin flora, soil organisms and nosocomial agents (since the patients are frequently taken to the hospital right after the traumatic event). The same agents are implied on children and adults, especially S. aureus, coagulase-negative staphylococci and aerobic gram-negative streptococci. Other pathogens are fungi, mycobacteria and anaerobes.

The H&N segment is a body region commonly subjected to surgical manipulation. From tooth implants to septoplasty, and all surgical acts can complicate infectiously, specially those procedures that requires implants.

Tooth implants become very popular in the past 20 years. Their failure can be divided into early and late. Early failure represents the deficiency to achieve osseointegration and occurs due to excessive surgical trauma, impaired healing, bacterial contamination and premature overloading. Late failure is the impossibility to maintain established osseointegration during functional loading. It is due to excessive occlusal stress and
bacterial-induced peri-implant bone loss. **Peri-implant radiolucency with irregular contours is the typical imaging finding, both on conventional radiography and CT studies.** Untreated bacterial-induced periodontitis may spread and reach deeper bone layers, leading to true osteomyelitis. Actually, this complication is thought to be rare, considering the large number of those procedures.

2. **Osteomyelitis related to systemic diseases**

   • **Sickle Cell Disease:**

   Bone and joint infections are serious complications of sickle cell disease and it is due to a number of factors, among them: hyposplenism, which is secondary to infarction and subsequent fibrosis in childhood; impaired phagocytosis and complement dysfunction, that reduces immune surveillance and increases susceptibility to infection by encapsulated bacteria. Infarction and necrosis of medullary bone create the tissue condition for bacterial growth.

   The infection is commonly haematogenous in origin, however, the direct spread of infection does occur, often from ulcers, for example. Bacteremia due to *Salmonella* and other **Gram-negative organisms** is thought to result from sickling within mesenteric vessels and subsequent gastrointestinal infarction, and are the most common bacterial pathogens linked to bone and joint infection in sickle cell disease (also thought to be implicated in most cases of osteomyelitis). Skin commensals, including *S. aureus* (the second most common causal agent) and anaerobic organisms, are frequently grown in laboratory cultures in such cases.

   High-resolution US allows characterization of soft-tissue changes, fluid collections and periosteal reaction, and can be used for the direct evaluation of the sites of greatest pain. It also allows guided diagnostic and therapeutic intervention, such as percutaneous drainage.

   **MR findings** such as bone marrow edema, fluid collection in adjacent soft tissue, and abnormal gadolinium enhancement of the periosteum, muscle, fascia and fat are seen in both infarction areas and osteomyelitis (Fig. 7). However, these features may be useful as imaging indicators of the response to antibiotic treatment in an established infection.

   • **Osteopetrosis:**

   Osteopetrosis is caused by malfunction of the osteoclastic activity of the bone (probably osteoclasts fail to release the necessary lysosomal enzymes for bone reabsorption into the extracellular space), resulting in **excessive formation of immature bone, thickening of the cortical layer and narrowing or obliteration of the medullary cavities** (Fig. 8). It is generally divided into three types: severe infantile malignant autosomal recessive, intermediate mild autosomal recessive, and benign autosomal
dominant. The prognosis of the first two types is very poor and the disease is characterized by an early onset, usually within the first decade of life, followed by an early death. The benign-type is characterized by a later onset and a longer life span.

Osteomyelitis is a well-recognized complication of osteopetrosis and the leading cause of the increased rate of infection is thought to be a lack of adequate bone vasculature and increase of susceptibility to infection. The most common site of involvement is the mandible, and it is associated with dental extractions or surgical exposure of the pathologic bone.

Radiographic findings show a uniform increase in bone density without corticomedullary demarcation ("bone within bone" signal). This aspect, however, doesn't interfere with the radiological appearance of osteomyelitis, which has been previously discussed.

- Diabetes Mellitus:

In general, infectious diseases are more frequent and/or serious in patients with diabetes mellitus, which potentially increases their morbimortality. The greater frequency of infections in diabetic patients is caused by the hyperglycemic environment that favors immune dysfunction (e.g., damage to the neutrophil function, depression of the antioxidant system and humoral immunity). The infections affect all organs and systems. Some of these problems are seen mostly in diabetic people, such as malignant external otitis and mucormycosis.

The fungal sinusitis in diabetic patients can be of distinct types with different pathophysiology and clinical presentation. Acute fulminant invasive sinusitis caused by Mucor or Aspergillus, chronic invasive sinusitis (Fig. 9), granulomatous invasive sinusitis caused by Rhinosporidiosis, fungal ball caused by Mycetoma, and allergic rhinosinusitis caused by Aspergillus are common variants. The CT findings in patients with fungal sinusitis include an expansive lesion involving the sinus with erosion of sinus wall, or a heterogeneous mass (with some hyperdense areas) within the sinonasal cavity, sometimes deviating the nasal septum to the opposite side from its occurrence. When orbital extension is present almost all patients course with proptosis.

Necrotizing (malignant) external otitis is a potentially life threatening infection in elderly diabetic patients presenting with severe otalgia (it will be detailed bellow).

3. Osteomyelitis secondary to contiguous process

Many infections of adjacent tissues or structures may evolve to osteomyelitis by contiguous spread. The majority of situations are listed below, but there are other conditions that have the potential to cause this complication. The main radiological role is
to identify the possible evolution to this situation by looking for early and also for expected findings.

- **Rhinosisinusitis:**

  If untreated, both acute and chronic rhinosinusitis may course with severe and potentially lethal complications. Osteomyelitis is one of those. It is important and difficult to differentiate between the origins of bone sinusosal walls sclerosis in chronic rhinosinusitis. It can be only a reaction to the inflammatory process or represent extension of the infection. Other signs that should raise suspicion to osteomyelitis secondary to rhinosinusitis are lytic bone areas, bone discontinuity, sequestra formation, periosteal reaction, focal rim-enhancing fluid collection with subperiosteal abscess. Acute fungal infections are potentially life-threatening situations which cause osteomyelitis in immunocompromised patients and should be promptly diagnosed for an early and aggressive treatment.

- **Otitis:**

  A special kind of otitis that usually occurs in immunocompromised patients is **necrotizing external otitis (NEO)** (Fig. 10). It is commonly caused by bacterial agents from *Pseudomonas spp.* group and is characterized by a swollen external auditory canal associated with areas bone erosion. Cranial neuropathies and skull base infection are common if treatment is delayed. Phlegmon is the name given to the solid enhancement of soft tissue adjacent to the site of NEO. If there is a rim enhancing pattern, abscess formation should be considered.

  Acute coalescent otomastoiditis is another form of presentation that usually courses with bone reabsorption due to intramastoid empyema, and osteomyelitis. Typical findings are the **Bezold's abscess** (walled-of pus surrounding sternocleidomastoid muscle) (Fig. 11), **posterior fossa abscess** and **sigmoid sinus thrombosis**.

  Ossicular chain infection with bone erosion is an extremely common complication of chronic otitis media, but it's not considered to be osteomyelitis. Normally, bone erosion in these cases is thought to be caused by increased osteoclastic activity, not by bone infection and inflammation.

- **Odontogenic infection:**

  Osteomyelitis from mandible and maxilla is often a complication of an untreated odontogenic infection. Normally it is caused by a polymicrobial bacterial infection. Radiologists play an important role depicting the initial process to define the treatment. The most common source is an infected tooth, which may present with **periapicopathy** and/or **periapical abscess**. Other causes include surgical and traumatic etiology (both discussed earlier). The infection may spread to the masticator, parotid and submandibular spaces, and lead to skin fistulas.

- **Apical petrositis:**
One common anatomic variant is the pneumatization of the petrous apex. **Infections of the mastoid cells may spread** and cause **apical petrositis** (Fig. 12). Rarely, non-pneumatized petrous apex may develop osteomyelitis from haematogenous spread. The formation of an abscess on this topography is a really important risk factor for the development of osteomyelitis in the petrous apex itself or the clivus. Enhancing petral and clival bone marrow on MR studies should raise suspicion for this disease and early diagnose is important due to the risk of neural and vascular complications. This anatomic variant should always be describe on H&N reports, especially in the context of an inflammatory otomastoiditis.

4. Differential diagnosis

A lot of conditions can mimic osteomyelitis, sometimes with a indistinguishable radiologic appearance. Clinical features are of great importance on those cases, since the same bone lesion may have an infectious or tumoral origin, depending on the simply presence of clinical manifestations.

- **Osteoradionecrosis:**

Osteoradionecrosis (Fig. 13) should be suspected in the scenario of a bone lesions occurring after radiation therapy (RT), normally 1-2 years after treatment (but even after 5 years). CT and MR studies are better to depict this condition than nuclear medicine methods, because they show other aspects that help to differentiate between secondary bone lesions and osteoradionecrosis with or without osteomyelitis (both would show radiotracer uptake in the nuclear medicine studies). If clinical history is unavailable, soft tissue changes can be used as a signalization of previous RT: skin and platysma muscle are usually diffusely thickened; salivary glands are modified and may be atrophic; mucosal changes can be depicted and divided into early (thickening and post-contrast enhancement) and late (fibrotic or stenotic pharynx). Another challenge in the diagnostic is the coexistence of osteomyelitis and osteoradionecrosis - when an abscess and/or fluid collections in the periosteal space are seen, they are taken as a specific sign of superimposed infection (Fig. 14).

Other possible findings after RT are: chondronecrosis, represented by cartilage fragmentation associated with soft tissue swelling, sometimes with enhancement after contrast injection; and temporal bone osteoradionecrosis, which shows a typical appearance named "moth-eaten" destruction and demineralization, sometimes with areas of sequestrum and without soft tissue changes.

- **Mandible-Maxilla Osteonecrosis secondary to biphosphonate use:**

Biphosphonates are the treatment of choice to osteopenia/osteoporosis and their use is increasing all over the world. The prevalence of this complication is 0.8-1.2% for intravenous use and less than 0.5% for orally taken biphosphonate. Mandible is twice
more affected than maxilla, since it is more prone to trauma. An important clue is a persistent and non healing tooth extraction socket, which can progress to pathologic fracture. CT is the best method to detect bone changes, that are often characterized by patchy lysis focus with sclerosing of adjacent trabecular bone and fractures, on advanced cases. Surrounding soft tissue swelling is seen on secondary infection. MR findings include low-signal on T1-weighted sequences, high signal on T2-weighted sequences and enhancement after contrast injection (Fig. 15). Sequestra may be seen. The radiological aspect is similar to osteomyelitis. Again, bone fragmentation is more relevant on osteonecrosis cases, and in osteomyelitis the site of infection (like tooth, for example) may be evident and periosteal reaction is more common.

- **Garré sclerosing osteomyelitis (GSO):**

  This is actually a special kind of chronic osteomyelitis, typical of children. It usually affects the mandible or maxilla, rarely affecting both, and is a consequence of an odontogenic infection resulting from dental cavities. However, no microorganism is isolated from bone alterations site. Redundant cortical layering of the bone, called "onion skin" (Fig. 16) is considered a pathognomonic finding.

- **Langerhans-cell histiocytosis (LCH):**

  A rare entity that is more frequent among children, LCH (Fig. 17) is a reticuloendothelial system disease characterized by the proliferation of Langerhans cells (dendritic mononuclear cells). It may affect bones from H&N segment, as a well-defined or "punched-out" lytic lesions without cortical borders, sometimes with periosteal reaction parallel to cortex. No sequestra or bone fragmentation is seen. Frequently lesions are not restricted to one bone or body segment, and this finding may lead to the diagnosis. Sometimes bone lesions are accompanied by soft tissue enhancing masses.

- **Ewing sarcoma:**

  Also known as primitive neuroectodermal tumor (PNET), this malignant bone tumor seldom occurs on H&N segment and more commonly affects children and young adults. On CT studies, it appears as a homogeneous mass that causes bone destruction and erosion, demonstrating a heterogeneous enhancing pattern. On MR studies, that mass demonstrates iso-signal on T1-weighted sequences and high signal on T2-weighted sequences, with enhancement after contrast injection.
**Fig. 1:** Acute osteomyelitis on the mental region of the mandible. Multiplanar reformatting of CT images demonstrates intramedullary bone destruction (straight arrow) and vestibular cortical erosion (curved arrow).

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Fig. 2: Abscess with peripheral contrast enhancement and a hypodense center (straight arrows) adjacent to an area of cortical erosion in the right condyle of the mandible (curved arrow). Coronal reconstruction (A,B) and axial (C) CT images.

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Fig. 3: Acute osteomyelitis of the right mandibular body and ramus. Axial post-contrast CT images (A,B,D) and oblique sagittal reconstruction (D) showing areas of erosion and cortical sclerosis (straight arrow in A, and asterisk in D). There are abscesses on the adjacent soft tissue (curved arrows) involving the masticatory space muscles. There are intramedullary foci of gas and periosteal reaction in the mandible angle (D), suggesting an acute process.

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Fig. 4: Chronic osteomyelitis of the mandible. Note the area of sequestra (straight arrows) and the post-contrast enhancement of the adjacent soft tissues (curved arrow). Axial post-contraste CT images (A,B) and volume rendering (C).

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**Fig. 5:** Osteomyelitis with fistula. Axial non-contrast bone window CT image (A), shows cortical thickening and medullary sclerosis. The arrows are pointing to the fistulous path to the platysma muscle (B,C) and to skin (D).

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Fig. 6: Post-surgical metal plates and screws released. Plain radiography (A), axial CT images on soft tissues window (B) and bone window (C,D) demonstrate radiolucent halo around the some screws, that suggests release.

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**Fig. 7:** Sickle cell disease with subperiosteals collections in the medial aspect of the mandibles ramus (arrows). Heterogeneous signal of the bone marrow adjacent to the collections, compatible with acute osteomyelitis. Axial post-contrast CT image (A), axial T1WI (B), axial T2WI (C), and axial (D) and coronal (E) post-contrast T1 FAT-SAT WI.

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**Fig. 8:** Osteopetrosis. Thickening of the cortical bones and obliteration of the medullary cavities (A,B). There are increased adjacent soft tissues with post-contrast enhancement (straigh arrow), as well as an area of thickened skin with focal retraction (curve arrow). Axial bone window CT (A,B), axial post-contrast CT (C), and coronal reconstruction post-contrast CT (D).

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**Fig. 9:** Fungal chronic sinusitis by Aspergillus. Heterogeneous mass localized on the left maxillary sinus (asterisks). Invasion of adjacent structures like the clivus (C), the inferior orbital structures (D), in addition to intracranial spread by the oval foramen (E). MRI: axial T1WI (A), axial T2WI (B), and axial (C) and coronals (D,E) post-contrast T1 FAT-SAT WI.

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Fig. 10: Diabetic patient with necrotizing external otitis. CT images (A to D), and MRI T2 WI and T1 WI post-gadolinium (E to H). There are several foci of bone erosion (red arrow) and increase and densification of soft tissue around the petrous segment of the right internal carotid (yellow asterisk). On the MRI images, there was extension of the process to the right petrous pyramid and the right temporomandibular joint (green asterisk). Post-contrast enhancement shows a calibre reduction of the right internal carotid (orange arrow head) and liquefied components (blue arrow).

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**Fig. 11:** Bezold's abscess. Patient presenting otomastoiditis complicated by lateral erosions and spread of the infection to the sternocleidomastoid muscle (Bezold's abscess). Axial bone window and axial soft tissue window post-contrast CT images.

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**Fig. 12:** Otomastoiditis (asterisks) with apical petrositis (arrows). Abnormal enhancing of the petral and clival bone marrow, and thrombosis of the adjacent sigmoid sinus. Axial T1WI (A), axial T2WI (B), and axial post-contrast T1 FAT-SAT WI (C).

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Fig. 13: Osteoradionecrosis. Patient with tongue tumor resected and radiotherapy. Observe the heterogeneous collection with peripheral enhancement within the vestibular cortical of the mandible's symphysis, in addition to bone marrow destruction. Axial window bone (A) and axial post-contrast soft tissue window (B) CT images. Sagittal reconstruction (C).

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Fig. 14: Osteoradionecrosis with osteomyelitis. CT post-contrast images of another patient after RT. Axial images showing subperiosteal thickening (A) adjacent to an area of medullary bone changes (B). Sagittal oblique reconstruction demonstrating an intraosseous fluid collection with gaseous foci within, indicating superimposed infection. In this patient a fracture was also noted representing another complication of this condition (D).

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**Fig. 15:** Bisphosphonate-related osteonecrosis of the mandible. Axial CT (A-C) and MR (D-F) showing an ossues fragment (A) and a lytic lesion on the right mandibular ramus. The lesion involves de internal cortical and is located posteroinferiorly to the mandibular foramen. Medular involvement by the inflammatory process is very well demonstrated on MR images by a low-intensity signal on T1 (D), high-intensity signal on T2 (E) and post-contraste enhancement (F).

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Fig. 16: Garré sclerosing osteomyelitis secondary to odontogenic infection, in a child. There is cortical layering of the bone, called "onion skin" (arrows). No microorganisms were isolated. Axial and coronal reconstruction CT images.

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Fig. 17: Langerhans-cell histiocytosis of the left mastoid. Heterogeneous osseous destruction of the left temporal bone, with post-contrast enhancement. Axial bone window (A) and axial soft tissue window (B) CT images. Axial T1 WI (C), axial T2 WI (D), and axial post-contrast T1 FAT-SAT (E) MR images.

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Conclusion

Osteomyelitis is a diagnostic challenge on the H&N region because it can assume multiple radiological appearances, inclusive an aggressive presentation. The clinical features are crucial to differentiate these cases from their commonest differential diagnosis, highlighting among them neoplastic disease.

Radiologists should always consider past treatments and chronic diseases in the evaluation of the imaging patterns. CT and MR are the most important modalities to depict anatomical changes, bone and soft tissue involvement and skull base structures infiltration, but nuclear medicine may contribute to the diagnostic since the degree of radiotracer are related to the blood flow and the rate of new bone formation.

The quick and accurate diagnostic is fundamental regarding the risk of complications and the importance to introduce an early and appropriate treatment.
Personal information

Address correspondence: palhiariduarte@gmail.com
References


