# TOOTH MOBILITY AND FLOATING TEETH

Mladen Milicevic, M.D. – University Hospital of Liege, Belgium

## AIM

Pathologies with a tooth mobility or floating teeth are discussed. They are mostly periodontal disease or aggressive periodontitis but it is not unusual to see different neoplasias, osteonecrosis, osteomyelitis or histiocytosis presenting the same particular signs. Differential diagnosis between these different pathologies is attempted, which is systematically impossible only by imaging in neoplasias.

## MATERIAL AND METHODS

Archieved data from 2018 to 2022 were reviewed. We studied systematically clinical presentation and imaging modalities for each patient, related to histopathologic diagnosis if applicable. All collected data are presented in tables 1 and 2 (the most common pathologies) and by several illustrative images, Fig. 1-8 (some rare pathologies included).

## RESULTS

The most used modality was CBCT for all pathologies. Localized infections were sometimes diagnosed by oral x-ray or by orthopantomogram. In case of suspicion of malignancy CT and MRI were valuable complimentary examinations. Differential diagnosis between different malignancies and benign tumors (Fig. 1, 2) and diagnosis of histiocytosis (Fig. 3A) and IG4-related disease (Fig. 3B) was impossible without histology but high suspicion of sarcoma (Fig. 4) and myxoma (Fig. 5) by imaging was frequently confirmed by histopathology.

The clinical context, with CBCT, was decisive for osteonecrosis (Fig. 6) and extended infectious diseases (Fig. 7).

Floating teeth were also seen in Central giant cell granuloma and Giant cell tumor.

## CONCLUSION

CBCT, in addition to clinical context, was a good imaging modality for all pathology with a tooth mobility even in cases of periodontal disease. CT or MRI often complemented CBCT in doubt of malignancy and histopathology for confirmation of diagnosis.

Tooth mobility and floating teeth were frequent in all studied cases but involvement of multiple teeth indicated mostly neoplasias.

## REFERENCES

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**2.** Mupparapu M (2016). Oral radiology: Interpretation and diagnostic strategies. Dent Clin N Am 60(2016): p.125-166.

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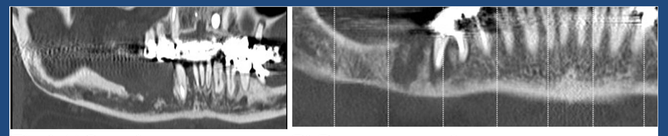

Fig.1 A) Lymphoma B) Breast metastasis

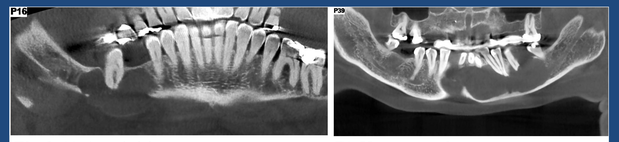


Fig.2 A) Ameloblastoma B) Keratocystic tumor

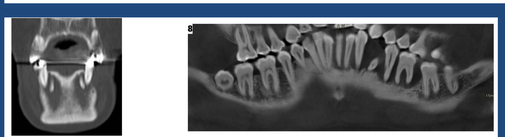

Fig.3 A) Non-X histiocytosis B) IG4-related disease

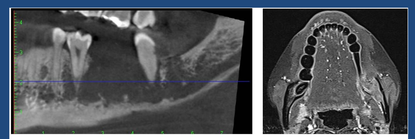

Fig.4 Sarcoma A) CBCT B) MRI

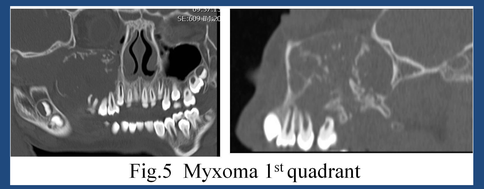

Fig.5 Myxoma 1st quadrant

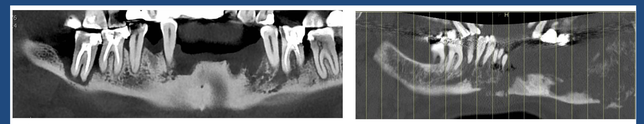

Fig.6 A) ORN B) MRONJ

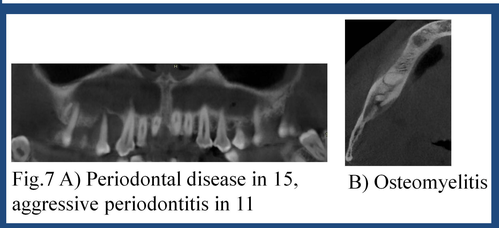

Fig.7 A) Periodontal disease in 15, aggressive periodontitis in 11 B) Osteomyelitis

### Table 1

| | DEMOGRAPHICS | PRESENTATION | NATURAL HISTORY AND PROGNOSIS |
|---|---|---|---|
| **PERIODONTAL DISEASE AND AGGRESSIVE PERIODONTITIS** | Older adults but < 30 years for aggressive periodontitis.<br>Incidence increase with hormonal changes: pregnancy, puberty, menopause. | Poor oral hygiene (infection-inflammation of supporting structure of teeth).<br>Red, swollen gums, bleeding; loose teeth.<br>Halitosis. | Risk factors: diabetes, HIV, hematologic disorders (immunodeficiency). |
| **OSTEORADIONECROSE** | 2-15% of patients with Head and Neck radiation therapy. | Devitalized exposed bone for > 3 months. Pain common, trauma, fistula, dysesthesia, fracture.<br>Usually 6-12 months after radiotherapy.<br>Poor oral hygiene smoking, alcohol. | Onset 4 months - 3 years after radiotherapy.<br>Risk factors: dose > 60 Gy, tumor location and involvement of bone. |
| **MEDICATION-RELATED OSTEONECROSIS OF JAWS** | F>M.<br>0,8-1,2% with I.V. bisphosphonates,<br><0,5% with oral bisphosphonates. | Non healing exposed bone>8 weeks.<br>If infection: pain, erythema, fistula, fracture, lysis. | Early detection and management minimizes progression.<br>Risk factors: age, immunodeficiency.<br>Antiresorptive and angiogenic drugs > 4 years. |
| **NEOPLASIAS**<br>**Osteosarcoma.**<br>**Chondrosarcoma.**<br>**Myxoma; Lymphoma.**<br>**Metastasis.**<br>**Ameloblastoma.**<br>**Primary intraosseous carcinoma.** | Osteosarcoma: 3-4th decades, M>F.<br>If secondary, in older adults.<br>Chondrosarcoma: 4-6th decades, M=F.<br>Metastasis: 5-7 th decades usually; F>M (breast!). | May mimic benign dental, sinusal, temporomandibular joint disorders.<br>Osteosarcoma: painless swelling, numbness, loose teeth, nasal obstruction, exophtalmos, epistaxis, trismus.<br>Chondrosarcoma: painless, enlarging firm mass, loose teeth, altered sensation, proptosis, headache, trismus.<br>Metastasis: pain, swelling, paresthesia of mandibular nerve, intraoral mass, tooth mobility, halitosis, fracture, large extraction socket. | Osteosarcoma: in 10-15% regional metastasis; poorer prognosis for maxillary lesions; imaging and histology not related to survival; 5 years survival 40%.<br>Chondrosarcoma: better prognosis than osteosarcoma; often local recurrence (20 years after!).<br>Metastasis: poor prognosis. |
| **OSTEOMYELITIS** | All ages. | Pain, swelling, fever, adenopathy; possible purulent drainage; trismus if infection in masticator muscles; hypoesthesia, anesthesia if mandibular canal involved. | Acute can progress to chronic.<br>Difficult to manage. |
| **LANGERHANS CELL HISTIOCYTOSIS** | LS: <3 years.<br>EG: young males or adults.<br>HSC: chronic-1st decade. | Intraoral swelling, pain, mass.<br>Teeth mobility; sockets do not heal after extraction.<br>Bleeding, halitosis. | Prognosis fatal in early infancy. LS acute! EG 60-70% of all cases.<br>Prognosis related to age of onset and degree of organ dysfunction.<br>Localized form-good prognosis; Acute disseminated - poor prognosis; Chronic disseminated - 10% lethal. |

### Table 2

| | LOCATION | IMAGING | DIFFERENTIAL DIAGNOSIS | ASSOCIATION |
|---|---|---|---|---|
| **PERIODONTAL DISEASE AND AGGRESSIVE PERIODONTITIS** | Periodontal disease: localized or generalized.<br>Aggressive periodontitis:<br>1st molars, central incisors.<br>Generalized with age. | Generalized bone loss. Clear cortication of remaining bone.<br>Surrounding bone sclerotic.<br>If aggressive periodontitis, necrosis or abscess of periodontium and combined periodontic-endodontic lesions. Arc shaped defects.<br>Widening of PLS > 2 mm from cemento-enamel junction. | Primary malignancy.<br>Metastasis.<br>Surgical defects.<br>Langerhans histiocytosis. | Dental crowding, dental impactions and restorations.<br>Diabetes, hematologic disorders, HIV, smoking, pregnancy, puberty, menopause (hormonal disbalance) |
| **OSTEORADIONECROSE** | Mandible>maxilla.<br>Nose, sinus, mandibular canal. | Lytic, mixed and sclerotic osseous changes, dental or periodontal disease; cortical destruction, periosteal reaction, widening of PLS, sequestrum.<br>Early signs MRI in bone marrow: T1 hypo, T2 hyper. | Recurrent tumor.<br>MRONJ.<br>Osteomyelitis. | Alcohol and tobacco abuse.<br>Infectious dental disease.<br>Immune deficiency. |
| **MEDICATION-RELATED OSTEONECROSIS OF JAWS** | Mandibule>maxilla. | Dental or periodontal disease, lytic destruction, cortical erosion, fracture, periosteal reaction (more frequent than in ORN) sequestrum; more dense than ORN.<br>In early involvement loss of T1 signal on MRI. | Osteomyelitis.<br>ORN.<br>Malignancy (metastasis!). | Antiresorptive and antiangiogenic drugs >4 years (I.V. >> oral!).<br>Extractions, trauma, dental disease, immune deficiency. |
| **NEOPLASIAS**<br>**Osteosarcoma.**<br>**Chondrosarcoma.**<br>**Myxoma; Lymphoma.**<br>**Metastasis.**<br>**Ameloblastoma.**<br>**Primary intraosseous carcinoma.** | Osteosarcoma: bone and soft tissue mass.<br>Chrondrosarcoma: entire mandible and anterior maxilla.<br>Ameloblastoma: posterior mandible. | Impossible to differentiate between malignancies in imaging.<br>Ill defined lytic changes, sometimes with osteoblastic component or periosteal reaction, irregular PLS widening; spiking resorption of roots; delayed healing of extraction sockets, permeative periphery, cortical destruction, loss of canal cortication.<br>Osteo and chondrosarcoma possible without calcifications.<br>Non Hodgkin lymphoma: overall bone morphology conserved.<br>Metastasis: lytic or osteoblastic. | Osteosarcoma: osteomyelitis, metastasis, chondrosarcoma, fibrous dysplasia, Ewing sarcoma.<br>Chondrosarcoma: osteosarcoma, fibrous dysplasia, metastatic tumor.<br>Metastasis: osteomyelitis, periapical inflammation, multiple myeloma. | Osteosarcoma: Paget, giant cell tumor, osteochondroma, enchondroma, Ollier disease, fibrous dysplasia.<br>Chondrosarcoma: osteochondroma, enchondroma, Ollier disease, Maffucci syndrome. |
| **OSTEOMYELITIS** | Mandible>maxilla. | Ill defined area of decreased density; periosteal reaction, sequestra, peripheral sclerosis; soft tissue gas; loss of cortical bone!<br>If early detection: low T1, high T2 and STIR; if chronic: low T1 and T2, surrounding tissue high T2 and STIR; T1 +C: marrow and surrounding soft tissue enhanced. | SCC, Osteosarcoma.<br>Metastasis.<br>Fibrous dysplasia.<br>MRONJ and ORN. | Immune-compromised patients, Diabetes, anemia, malnutrition, alcohol, tobacco. |
| **LANGERHANS CELL HISTIOCYTOSIS** | Mandible>maxilla.<br>Posterior>anterior.<br>Mono or polyostotic.<br>EG localized. | Bone scooped out, well defined or punched out radiolucency (difference with periodontal disease), without corticalized border.<br>Sometimes periosteal reaction. | Periodontal disease .<br>Aggressive periodontitis.<br>SCC, Osteomyelitis, Metastasis.<br>MM (older); Non-X histiocytosis. | Multiple bone lesions.<br>Diabetes.<br>Exophtalmos. |

Abbreviations: PLS (Periodontal ligamentary space) -- MM (Multiple myeloma) -- LS (Letterer-Siwe) -- EG (Eosinophilic granuloma) – HSC (Hand-Schuler-Christian) -- SCC (Squamous cell carcinoma )-- ORN (Osteoradionecrosis) -- MRONJ (Medication-related osteonecrosis of jaws.