Medication-related osteonecrosis of the jaw (MRONJ): New insights on ethically responsible risk preventive strategies.
Part 3: Preventive strategies for minimising risk of MRONJ

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Executive summary

Clinical significance

- Medication-related osteonecrosis of the jaw (MRONJ) is a rare but serious adverse effect commonly seen in patients taking antiresorptive (AR) and antiangiogenic (AA) medications for bone metastatic cancer or osteoporosis.
- Invasive dental procedures in patients with osteoporosis and bone metastatic cancers frequently intersect with AR and/or AA therapy, raising concerns about MRONJ and delayed healing.
- MRONJ has emerged as a significant clinical and ethical concern for dental practitioners.
- Part 3 of this series synthesizes current guidance and evidence on ethically responsible preventive strategies for mitigating the risk of MRONJ

Key points

- Osteoporosis and metastatic bone cancers are typically managed by antiresorptive (AR) and antiangiogenic medications.
- AR and AA are the most common medications that can cause MRONJ.
- Medication-related osteonecrosis of the jaw (MRONJ) is a rare but serious adverse effect of AR/AA therapy.
- Although MRONJ remains relatively uncommon, its consequences can be devastating.
- Tooth extraction is identified as a principal local risk factor or trigger for MRONJ.
- Prevention represents the most effective and ethically sound approach to MRONJ management.

- Patient history and clinical examination are crucial diagnostic tools for the mitigation of MRONJ risk.

Practice implications

- Before commencement of AR or AA therapy, or as soon as possible thereafter, aim to get the patient as dentally fit as feasible, prioritising preventive care.
- A thorough medical history review, early identification of at-risk patients, pretreatment oral health optimization, and elimination of potential infection sources can significantly reduce future complications.
- During and after therapy, minimally invasive dental techniques, careful management of prosthetics, reinforcement of oral hygiene maintenance, and regular follow-up are essential.
- Routine dental treatment should include personalised preventive care while adopting a more conservative approach in higher-risk patients.
- Give greater consideration to less invasive alternative treatment options before performing extractions and other bone-impacting treatments in higher-risk patients.
- Collaboration with physicians and oncologists ensures coordinated care and informed timing of dental procedures, while continuous patient education fosters shared responsibility for prevention.
- Patients with suspected MRONJ should be referred to a specialist with expertise in treating this condition.

Background

Medication-related osteonecrosis of the jaw (MRONJ) is a rare but serious and often debilitating condition. It is primarily associated with the use of antiresorptive (AR) and antiangiogenic (AA) medications prescribed for osteoporosis, metastatic bone disease, and certain malignancies, causing progressive bone destruction in the maxillofacial region.[1-6] This condition, first described in the early 2000s, in association with bisphosphonate therapy and later with other AR and AA agents, is characterized by exposed necrotic bone in the maxillofacial region that fails to heal over a prolonged period. MRONJ has subsequently emerged as a significant clinical and ethical concern for dental and medical practitioners worldwide, given its potential to compromise oral function, cause chronic pain, and impair quality of life.[7-9]

The increasing use of medications such as bisphosphonates, denosumab, and targeted cancer therapies in managing osteoporosis, metastatic bone disease, and other malignancies underscores the growing need for preventive vigilance in dental practice. With the increasing prevalence and burden of osteoporosis[10] and cancers such as prostate, breast, and lung cancer, and multiple myeloma every year, there is an associated rise in the use of AR and AA medications.[2,11] With the increasing use of these medications, there is a greater likelihood of an increase in the incidence of MRONJ cases, underscoring the growing need for preventive vigilance in dental practice.[2,12,13]

Although the prevalence of MRONJ remains relatively low, its impact on affected individuals is profound, and its prevention represents a fundamental component of ethically responsible and patient-centred dental care.[1,2,6] MRONJ can occur spontaneously or following invasive dental procedures, such as tooth extraction, periodontal treatment, implant placement, or ill-fitting dentures. MRONJ is most triggered by tooth extraction.[1-4,14]

The pathophysiology of MRONJ is multifactorial, involving altered bone remodelling, inhibition of angiogenesis, infection, and local trauma to the oral mucosa or bone.

Medications such as bisphosphonates, denosumab, and specific AA agents reduce bone turnover and vascularity. While beneficial in managing skeletal complications, these medications may predispose the jaws to necrosis following invasive dental procedures or infection.[1] Risk is further influenced by systemic factors, including advanced age, malignancy, corticosteroid use, and poor oral hygiene, underscoring the complexity of prevention in clinical practice. (See Part 2) Given this complexity, preventive strategies must integrate both medical and dental dimensions of care, emphasizing risk identification, interprofessional communication, and evidencebased clinical decision-making.[15,16]

Dentists play a significant role in identifying patients at risk and preventing MRONJ.[12,17] Assessing, preventing, and managing the risk of MRONJ can be very challenging, with huge implications for patients and clinicians.[3,6,15,18] While dentists may be first in line to diagnose and treat patients, they have to collaborate closely with oncologists, physicians, and OMFS (oral maxillofacial surgeon) specialists in a coordinated manner to be able to diagnose and treat patients with a greater chance of success.[7,9,15] Therefore, preventive strategies should be implemented before, during, and after AR or AA therapy to minimise MRONJ risks."[13,19,20-24]

Ethically, the obligation to prevent MRONJ aligns with the professional principles of non-maleficence (not to harm) and beneficence (to act in the patient's best interest).

Preventive efforts must be guided by informed consent, shared decision-making, and respect for patient autonomy, ensuring that individuals are fully aware of the risks and benefits of both dental and systemic treatments. In this context, the prevention of MRONJ is not solely a clinical objective but a reflection of moral and professional integrity.

- ***Purpose***

This narrative review is primarily directed at dental practitioners who are likely to see patients taking AR or AA medications prescribed by physicians and/or oncologists to prevent and treat a wide variety of medical conditions.

The purpose of Part 3 of this series: Preventive strategies for minimising risk of MRONJ – is to provide clinical guidance on ethically responsible preventive strategies to minimise the risk of MRONJ: (i) in patients before receiving AR and/or AA therapy; (ii) in patients currently receiving AR or AA therapy; and (iii) preventive strategies when tooth extraction is indicated in patients receiving AR and/or AA treatment for osteoporosis or metastatic bone cancers.

Preventive measures before AR/AA therapy

Before commencement of AR or AA therapy, or as soon as possible thereafter, aim to get the patient as dentally fit as feasible and prioritise preventive care. Primary prevention remains the preferred method for minimizing the potential risk of MRONJ once treatment begins and should include the following critical interventions.[15,25]

- ***Comprehensive examination***

To minimize the risk of MRONJ, a comprehensive dental examination with dental radiographs and timely tooth extraction is crucial before initiation of AR/AA therapy. Implementing these preventive measures may help reduce the incidence of MRONJ in patients undergoing high-dose"[26] Broad consensus exists that comprehensive dental and periodontal examination should be performed, including panoramic or intraoral radiographs, to identify teeth with uncertain prognosis, reduce sources of infection, and to ensure that dental procedures or dental and periodontal sources of infection do not become risk factors for MRONJ once AR/AA therapy begins.[16,27,28]

- ***Advise on MRONJ risk, shared decision-making, and consent***

Discuss the low but real MRONJ risk and the importance of maintaining good oral hygiene and oral health. Informed consent with plain-language risk framing (including the uncertainty around holidays/markers), and documentation.

- ***Interprofessional liaison and collaboration***

Communicate with the prescribing physician/endocrinologist/oncologist regarding proposed timing and indication of therapy, type of medication, dosage, durations, and possibility of a brief postponement of AR/AA therapy in cases where the extraction of hopeless/non-restorable and infected teeth is indicated.

- ***Interceptive care before therapy starts***

A pre-treatment dental examination and timely extraction of the indicated tooth before high-dose AR administration may reduce the risk of MRONJ. These findings highlight the importance of early dental intervention in patients receiving high-dose AR treatment.[26] Invasive dental procedures (i.e., extractions, periodontal treatment), should ideally be completed 2-3 weeks before AR/AA therapy to allow healing and minimize MRONJ risk.[29] Address existing dental problems (periapical and periodontal infections) before initiation of AR/AA therapy.[2] Interceptive dental treatment reduces downstream surgical needs during therapy and aligns with non-maleficence and beneficence. Primary prevention strategies include optimizing oral hygiene, preventing and managing dental caries and periodontal disease, and extracting hopeless teeth in patients before starting AR/AA therapy to reduce the risk of MRONJ.[15,25]

It is currently unclear how aggressive preventive care should be and how each intervention reduces MRONJ risk.[30] Moreover, there seems to be a need for individually tailoring prevention to each patient's specific needs, as all medically indicated dental care might not be feasible, considering the patient's frailty, the limited life expectancy, and the urgency of prompt initiation of AR/AA therapy. When dental extractions are performed, AR/AA therapy can be started after mucosal coverage has occurred.[27]

- ***Patient education, increase awareness, and optimisation of oral health***

Optimization of dental health before the initiation of antiresorptive/ antiangiogenic therapies if systemic conditions permit.[1] Eliminate and stabilize oral disease before initiation of antiresorptive and/or antiangiogenic therapy, as well as maintenance of good oral hygiene.

Increase patient awareness of the importance of maintaining proper oral hygiene and oral health, regular dental recalls,

Table 1: Checklist for preventive measures before AR/AA therapy

☐ Comprehensive medical history, dental, and periodontal assessment
☐ Advice on MRONJ risk, shared decision-making, and consent
☐ Interprofessional liaison and collaboration
☐ Interceptive dental care before therapy starts
☐ Patient education, increase awareness, and prioritize health
☐ Reinforce optimal oral hygiene maintenance and regular monitoring.
☐ Referral to OMFS for medically complex cases

early management of infections, and denture adjustments to avoid future extractions or any oral surgeries or procedures that may impact bone, thereby preventing the potential future risk of MRONJ.

- ***Optimization of oral health through:***

(i) Early screening and appropriate dental care before initiation of antiresorptive therapy in collaboration with the treating physician. [1,6,31]

(ii) Dental health surveillance in prostate and breast cancer patients resulted in a 2.5-fold reduction in relative risk.

(iii) Treatment planning for patients at risk of developing MRONJ should include a comprehensive examination of the oral cavity and radiographic assessment to identify both acute and chronic infection sites.[1,6,31]

(iv) Continuous patient motivation and education regarding the importance of maintaining proper oral hygiene and smoking cessation.[1,6,31]

- ***Consult and/or referral to OMFS specialist***

For medically complex patients, such as those receiving chemotherapy, radiation therapy, immunosuppressants, and corticosteroids, consider consulting or referring them to an OMFS specialist for clinical assessment and treatment planning.[32]

A checklist for essential strategies to prevent MRONJ risk before AR/AA therapy is summarised in **Table 1.**

Preventive measures and continuing dental treatment in patients during AR/AA therapy

Multidisciplinary collaboration among health care providers is fundamental in identifying high-risk individuals (*See Part 2 Table 5*), educating and raising awareness of MRONJ risks and the importance of optimizing oral hygiene and oral health, and implementing preventive measures to mitigate MRONJ risk.[30] Currently, there is no single technique that can eliminate MRONJ. Recognising risk factors and using tailored preventive measures for individual patients remains the most effective approach.[1,40]

- ***Collaborative approach***

Multidisciplinary collaboration among health care providers is fundamental in identifying high-risk individuals, educating patients and implementing preventive measures.[30]

- ***Comprehensive examination***

Patient medical and dental history and clinical examination remain the most sensitive diagnostic tools for MRONJ.[29] A comprehensive dental and periodontal examination should be performed, including panoramic or intraoral radiographs.[16,27]

- ***Risk-based preventive dental screening***

It is crucial to assess whether a patient taking AR or AA medications is at low or higher risk of developing complications based on their medical condition, type, dosage, and duration of medication therapy, as well as any other co-morbidities and complication factors.[30] (*See Part 2*)

- ***Advise on MRONJ risk, shared decision-making, and consent***

Educate and inform patients about the higher risk of MRONJ in the setting of malignant cancers, especially with tooth extractions and other invasive dental procedures, and the importance of regimented dental care and prevention.[1] Or implants should ideally be completed before initiation of AR and/or AA therapy.[29]

Discuss the low but real MRONJ risk, the uncertain value of drug holidays (medication interruption), and the rationale for minimally invasive alternatives (endodontic therapy, coronectomy/coronal amputation). Provide written information; document patient values/preferences in line with national consent guidance.

- ***Interceptive dental and oral health care***

Personalised preventive advice in primary care should be a crucial element of routine dental treatment. Dental infections are significantly related to MRONJ, making the prompt identification and treatment of an underlying infection vital for preventing its development.[21] Treat active infection first (endodontic therapy, drainage, antimicrobial mouthrinses); definitive extraction only if prognosis is hopeless or conservative care is unacceptable to the patient.

Perform straightforward extractions and other bone-impacting treatments in low-risk patients in primary care. Adopt a more conservative approach in higher-risk patients, considering other, less invasive alternative treatment options before performing extractions and other bone-impacting treatments in primary care.[32]

Regular dental care, along with prophylaxis, caries control, conservative dentistry, endodontic, and periodontal treatment, is crucial for maintaining oral health during AR/AA therapy. Avoid dento-alveolar surgery, if possible, especially in higher-risk cases, and consider root retention techniques to avoid extractions.

Periodontal therapy

Current evidence indicates that periodontitis is associated with increased risk of MRONJ.[28] Periodontal diseases should therefore be proactively managed in patients taking AR and/or AA medications due to increased risk of MRONJ with tooth extraction.[39]

Since patients are already at risk, dentists must employ conservative management strategies to prevent irritation of the bone, soft tissues, and blood supply. Consequently, a non-surgical approach such as guided biofilm therapy (GBT), root planing, scaling, and pocket probing is recommended. Patients at high risk (e.g., periodontal treatment) should receive antimicrobial mouth rinses and prophylactic antibiotics, starting 2-3 days before the intervention.

Endodontics

Root canal treatment provides a safe alternative to extraction by addressing infections and periapical lesions, while minimizing invasive interventions.[15] To ensure the safety and efficacy of endodontic procedures the following precautions should be observed:

(i) Informed consent and coordinating with the patient's treating oncologist or physician.
(ii) Pre-procedure antimicrobial rinse to reduce oral microbial load.
(iii) Avoiding vasoconstrictors.
(iv) Rubber dam application to maintain aseptic environment and minimize stress and trauma.
(v) Accurately maintain apical constriction and prevent apical extrusion of debris by using electronic apex locators and NiTi rotary systems for root canal shaping; and
(vi) Avoid apical overfilling and over-extrusion during obturation.[41]

Although endodontic treatment is not considered a risk factor for MRONJ, apicoectomy should be avoided as it carries similar risks as tooth extraction.[15]

Prosthodontics

In patients with cancer-related bone loss, the alveolar ridge is more susceptible to functional loads.[42] Thus, treatment should be aimed towards minimizing stress load and the impact of the dental prostheses on the supporting mucosa.

Use of telescopic crowns in high-risk patients is crucial for rigid stabilisation and minimising mobility of removable prostheses, thus significantly reducing mucosal irritation and risk of developing MRONJ. In addition, it is recommended that denture bases should be carefully prepared and fabricated with heat-cured resilient liners to ensure even load distribution. Frequent replacement of definitive soft liners is advised, as uneven forces could trigger MRONJ.[42] Meticulous cleaning practices and removal of dentures at night-time are recommended.

Orthodontic treatment

Although orthodontic treatment is generally considered safe, special consideration is required in patients at risk of MRONJ. It is crucial to avoid invasive procedures, such as extractions, and to maintain good oral hygiene through regular monitoring.[43] Orthodontic movements that may strain bone should be minimised to mitigate the risk of MRONJ.[43] Non-invasive approaches (e.g., clear aligners) are preferred over more invasive options (e.g., braces) whenever feasible. Comprehensive patient history and interprofessional communication with orthodontists about

Table 2: Checklist for preventive measures to mitigate MRONJ in patients receiving AR/AA therapy

☐ Collaborative approach and liaison with prescribing physicians
☐ Comprehensive medical history and oral examination
☐ Risk-based dental preventive screening
☐ Advice on MRONJ risk, shared decision-making, and consent
☐ Interceptive dental and oral health care
☐ Reinforce optimal oral hygiene maintenance and regular monitoring
☐ Referral to OMFS

patients' treatments with high-risk medications are critical to ensure safe and effective orthodontic treatment."

Dental implantology

MRONJ has been observed in patients with osteoporosis or cancer on oral BP therapy, particularly following dental implant placement, explantation of implants, and peri-implantitis cases.[44] In a recent systematic review and meta-analysis, Lin and co-workers found that in patients with dental implants, there was a very low certainty level of evidence suggesting that BP may be associated with a greater risk of implant failure and MRONJ. However, it remains unknown whether denosumab is associated with MRONJ on dental implants.[45] Thus, highly stringent care regimens are strongly advised. These regimens should include regular follow-up intervals, radiographic examinations, regular dental hygiene, and cleaning of the peri-implant tissues and crowns.[44]

In high-risk patients, such as cancer patients on high-dose AR and/or AA medications, implant-related surgical procedures are generally contraindicated due to a significantly higher MRONJ risk; therefore, alternative treatments should be considered. If implants are necessary, such as for prosthodontic rehabilitation, a thorough risk-benefit analysis is required in consultation with the prescribing/treating oncologist and other healthcare providers.[44]

• *Referral to OMFS*

For medically complex patients for whom you would usually seek advice, including higher-risk patients who are being treated with AR or AA medications for the management of cancer, consider consulting or referral to an OMFS specialist regarding clinical assessment and treatment planning.[32]

A checklist for preventive measures to mitigate MRONJ in patients receiving AR/AA therapy is summarised in **Table 2.**

MRONJ risk prevention in patients receiving AR/AA therapy where tooth extraction is necessary

Tooth extraction remains a significant risk factor and clinical challenge, particularly in patients undergoing antiresorptive therapy for osteoporosis and osteopenia and (cancer-related) osseous malignancies (metastatic bone disease), for medication-related osteonecrosis of the jaw (MRONJ).[46] Therefore, tooth extraction requires ethically responsible planning and execution to minimize trauma and subsequent complications associated with MRONJ.[46]

Local etiological factors that trigger the development of MRONJ include tooth extraction, periodontal surgery, and dental implant therapy. Tooth extraction is the primary triggering factor. Consequently, several preventive procedures have been recommended to reduce the risk of MRONJ following tooth extraction. These include medication discontinuation (drug holiday), improved oral hygiene, antibiotic treatment, mouth rinses, atraumatic extraction, primary closure of the extraction socket, laser biostimulation, and the application of autologous platelet concentrates (A-PRF).[12,47]

Currently, there is no single technique that can eliminate MRONJ. Recognising risk factors and using tailored preventive measures for individual patients remains the most effective approach.[1,40]

• *Confirm indication for extraction*

- Clinical assessment indicates that a tooth is hopeless (fractured, non-restorable, severe mobility, advanced infection) and therefore requires immediate extraction.

- In medically complex cases or where patients are classified as higher risk for MRONJ, explore all possible conservative alternatives where teeth could potentially be retained (i.e., endodontics, coronal amputation, monitoring, or retaining roots in the absence of infection).
- However, when the infected tooth is not restorable or has a poor prognosis, extraction may become necessary. In such cases, minimising trauma during the extraction and following preventive protocols is essential to reduce the risk of MRONJ.[21]

• *Pre-extraction risk-based assessment*

- Assess whether the patient is a low risk or higher risk of developing MRONJ based on their medical condition, type, dosage, and duration of medication therapy, and any other co-morbidities and complication factors.[15,30] (See Part 2)
- During AR/AA therapy and in collaboration with the prescribing/treating oncologist, physician, or oral maxillofacial surgeon, the dentists must categorise procedures based on the patient's risk level.[15]
- The risk of MRONJ increased significantly when tooth extraction was performed in patients diagnosed with periodontal disease; therefore, periodontal diseases should be proactively managed in patients taking bisphosphonates.[39]
- Medically complex and higher-risk patients should preferably be referred to an OMFS specialist for removal of the tooth.
- Techniques that are typically prescribed to minimize the risk of MRONJ during performance of invasive dental procedures, especially in high-risk patients, include antimicrobial mouth rinses (0,12% CHX), antibiotic prophylaxis (amoxicillin /Clavulanic acid), and proper wound closure.

• *Inter-professional collaboration and liaison*

- Collaboration between the primary health care providers (e.g. dentist & medical practitioner), and prescribing / treating oncologist and/or physician, and oral maxillofacial surgeon to ensure detection and timely and effective intervention.[1,29]
- Contact and liaise with the prescribing physician regarding medication interruption. For all high-risk patients, communication with the treating oncologist/physician, informed consent, and careful treatment planning are essential to mitigate MRONJ.[15]

• *Shared decision-making and consent*

- Explain the rare but possible MRONJ risk to the patient if an extraction or another procedure that impacts the bone is required.
- Discuss uncertainties relating to medication interruption and all treatment alternatives.
- Discuss the risks and benefits associated with treatment with the patient to ensure valid consent and proceed with the treatment as clinically indicated.[32]
- The patient must understand and agree to the proposed treatment plan. Obtain and document informed consent.
- Provide written information outlining risks, alternatives, expected recovery, and what to report post-op.

• *Pre-extraction preparation*

- Always consider treating active infection before extraction.
- Optimise oral hygiene (Patient instruction and professional guided biofilm removal is crucial).
- Prescribe antimicrobial mouthrinse (e.g., Chlorhexidine 0,12 -0,2%).
- Consider antibiotic prophylaxis if indicated (cases-by-case as per local guidelines)

• *Extraction/surgical technique*

- Minimal intervention or atraumatic approach: root sectioning, no or minimal flap, and preserve cortical bone.[2] The focus is on careful surgical technique, ensuring smooth, sharp alveolar margins, minimising trauma, and aiming for proper tension-free soft tissue wound closure with sutures where possible.[33]
- By adhering to good surgical and post-surgical protocols, dental practitioners can help minimize MRONJ risk and support optimal healing.[15] These surgical tenets are consistently endorsed in MRONJ prevention literature and position papers.

• *Post-operative care*

- Reinforce rigorous oral hygiene practices and use of antimicrobial rinse for 2 weeks.
- Antibiotics should only be prescribed where indicated in medically complex patients (i.e., diabetes, patients on immunosuppression, and immunomodulatory medications).
- Analgesia and infection control: NSAIDs/acetaminophen per standard protocols; antibiotics if infection or complex surgery warrants.
- Antiseptic mouthrinses for 1–2 weeks; meticulous hygiene

Table 3: Checklist for MRONJ preventive strategies for tooth extraction in patients receiving AR/AA therapy

☐ Confirm indication for extraction
☐ Comprehensive medical history and oral examination
☐ Pre-extraction risk-based assessment
☐ Inter-professional collaboration and liaison
☐ Shared decision-making and consent
☐ Patient education on the importance of proper oral hygiene, regular monitoring, and risk awareness
☐ Pre-extraction surgical preparation
☐ Minimal intervention extraction/surgical technique
☐ Post-operative care
☐ Monitoring and Escalation
☐ Referral to the OMFS specialist if the extraction socket is not healed at 8 weeks
☐ Reinforce the importance of maintaining proper oral hygiene, regular monitoring, and risk awareness.

away from the site initially.

- Structured follow-up: Re-examine at ~2 weeks (soft-tissue closure) and again at 6–8 weeks; educate patients on red flags (exposed bone, persistent pain, non-healing socket, suppuration).
- Patients should also be educated on the signs and symptoms of MRONJ, such as localised pain, exposed bone, infection, and swelling. Advise the patient to contact the practice if they have any concerns, such as unexpected pain, tingling, numbness, altered sensation, or swelling in the extraction area.[32] Early detection of these symptoms is critical for timely intervention.[34]

• *Monitoring and Escalation*

- Escalation: Any non-healing socket or exposed bone persisting beyond 8 weeks meets MRONJ criteria (in the absence of jaw irradiation) and warrants specialist evaluation per AAOMS staging pathways.
- Review healing of the extraction socket based on the diagnostic criteria and staging of MRONJ as set out in the AAOMS position paper.[1]
- Comprehensive medical and dental history, clinical assessment, and orthopantomography are crucial and should be the initial investigative method.[2] For a more thorough assessment, digital imaging techniques such as cone-beam computed tomography can be used.[35,36]
- Radiographic characteristics such as sclerotic bone or a combination of radiopaque and radiolucent lesions, along with the presence of a non-healing extraction socket, are commonly present in the early stages of MRONJ.[2]
- The radiographic changes in MRONJ include a persisting alveolar socket, osteosclerosis, osteolysis, thickening of the lamina dura, narrowing of the mandibular canal, widening of the periodontal ligament space, and sequestrum formation.[30] The radiographic presentation in advanced stages of MRONJ may include sequestrum formation, lamina dura thickening, and pathological fractures.[36] Computer tomography has become the gold standard method for detecting the most common characteristics and staging of MRONJ.[37,38]
- If the extraction socket is not healed at 8 weeks (exposed bone, draining fistula, persistent pain), and you suspect that the patient has MRONJ, refer to an OMFS specialist.

• *Continuous oral health prevention and maintenance*

- Enrol the patient in a continuous oral health maintenance program.
- Prioritizing overall health optimization and focusing on oral health
- Educating patients about the potential risks of medication AR/AA therapy and the impact of compromised oral health
- Reinforce the importance of routine dental check-ups and the impact of compromised oral health.

- Encourage lifestyle factors supporting bone and oral health (i.e., meticulous oral hygiene, proper diet, smoking cessation, and limiting alcohol use).

Conclusion

The prevention of MRONJ remains one of the most significant responsibilities of dental practitioners involved in the care of patients receiving AR or AA therapies. As the therapeutic use of these medications expands in the management of osteoporosis, metastatic bone disease, and other systemic conditions, the ethical and clinical imperative to prevent MRONJ has never been more critical. Prevention relies on early recognition of risk, patient education, interdisciplinary communication, and the consistent application of evidence-based dental protocols.

Fundamentally, the cornerstone of MRONJ prevention is risk assessment before the initiation of drug therapy. Comprehensive oral evaluations, elimination of potential infection sources, and stabilization of oral health before antiresorptive treatment significantly reduce the likelihood of complications. During therapy, conservative management strategies—such as avoiding unnecessary extractions, using minimally invasive techniques, and ensuring meticulous oral hygiene—serve as practical measures to minimize trauma to the bone and surrounding tissues. Continuous patient education about maintaining oral hygiene, reporting oral symptoms early, and attending regular dental reviews further strengthens preventive outcomes.

Interprofessional collaboration between dentists, physicians, oncologists, and pharmacists is equally vital. Effective communication ensures that dental care aligns with the patient's overall medical plan and that decisions regarding temporary interruption or timing of medication are made ethically and safely. Such teamwork embodies the principle of beneficence, emphasizing the duty to act in the patient's best interest while avoiding harm (non-maleficence). Ethical practice in MRONJ prevention also demands respect for patient autonomy—through informed consent and shared decision-making—and justice, by ensuring equitable access to preventive care and education for all patients at risk. Dental practitioners must remain up to date with evolving guidelines, integrating new evidence and technologies that improve risk prediction and patient safety.

Ultimately, MRONJ prevention is not only a clinical challenge but also an ethical commitment to uphold the integrity of oral healthcare. By combining vigilance, communication, compassion, and scientific rigor, dental practitioners can substantially reduce the incidence of this debilitating condition. A proactive, preventive, and ethically responsible approach ensures that advances in systemic therapy do not compromise oral health, quality of life, or professional duty.

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