DENTAL IMPLANTS IN MEDICALLY COMPROMISED PATIENTS

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OBJECTIVES

- Name the medical conditions that might compromise the outcome of implant treatment
- Correlate possible failure risk of implants in the different groups of medically compromised patients

DENTAL IMPLANTS

Success rate about 95% at 10 years

Some medical conditions may affect the ability to place implant or lower the success rate

Always check PMH/ PSH/ meds/ allergies / vitals

ASA

1- Healthy
2- Mild systemic disease
3- Severe systemic disease
4- Severe systemic disease that is a constant threat to life
5- Not expected to survive without the operation
6- A declared brain-dead, organ donor

DENTAL PROCEDURES

Type 1: Exam, Radiographs, Impressions, Prophy.

Type 2: SRP, RCT, Restorative, Simple extraction, Simple implants

Type 3: Multiple Extractions, Flap, Impaction, apico, Ridge Augmentation, Multiple implants, unilateral sinus lift

Type 4: Full arch implants, Bilateral sinus lift, Autogenous grafts.

RISK		Type 1	Type 2	Type 3	Type 4
Mild	ASA II	+	Sedation Stress Reduction Protocol	IV Sedation Stress Reduction Protocol	
Moderate	ASA III	+	IV Sedation Stress Reduction Protocol Physician		Hospitalization
Severe	ASA IV	+	Postpone All Elective Procedures		

CONTRAINDICATIONS TO DENTAL IMPLANTS?

- True vs relative
- Risk of perioperative complications
- Risk of implant failure

ABSOLUTE CONTRAINDICATIONS

Controversial	Recent MI	Cerebrovascular accident	Transplant or valvular prosthesis surgery	Profound immunosuppression
Severe bleeding issues	Active treatment of malignancy	Drug abuse	Psychiatric illness	Intravenous bisphosphonate use

little or no evidence to support most of these contentions.

RELATIVE CONTRAINDICATIONS

Children & adolescents

Severe bleeding tendency

ORN risk

Osteoporosis

Diabetes

Cardiovascular disease

Epileptic patients

Endocarditis risk

MI risk

smoking

HIV

Old age is NOT a Contraindication

CARDIOVASCULAR DISEASES

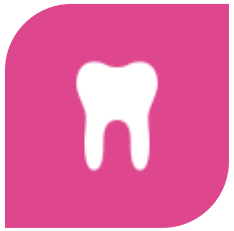
- HTN
- CAD
- CHF
- Infective Endocarditis

- Perioperative risk (bleeding, MI)
- No change in implant success rate

HYPERTENSION

- Always check blood pressure prior to any procedure involving LA
- Limit epi (0.04 mg)
- Postural hypotension
- <180/110
- Gingival overgrowth

BLEEDING DISORDERS



MANAGE AS YOU WOULD DO FOR DENTAL EXTRACTIONS

ASA/ PLAVIX → DON'T D/C

WARFARIN → OK IF INR > 3.5

HEMOPHILIA, VWD: CHECK INR/ PTT, FACTOR LEVELS

NO EFFECT ON SUCCESS RATE

American Heart Association's Protocol for IE Antibiotic Prophylaxis			
		Single dose 30-60 min before procedure	
Situation	Agent	Adults	Children
Oral	amoxicillin	2g	50 mg/kg
Unable to take oral medication	ampicillin, or cefazolin or ceftriaxone	2g IM or IV 1 g IM or IV	50 mg/kg IM or IV 50 mg/kg IM or IV
Allergic to PNC or ampicillin – oral	Cephalexin, or clindamycin, azithromycin or clarithromycin	2g 600 mg 500 mg	50 mg/kg 20 mg/kg 15 mg/kg
Allergic to PNC or ampicillin and unable to take oral medications	cefazolin or ceftriaxone, clindamycin phosphate	1 g IM or IV 600 mg IM or IV	50 mg/kg IM or IV 20 mg/kg IM or IV

Infective Endocarditis: *Prophylaxis*

INDICATED	NOT INDICATED
✓ Prior history of endocarditis	✗ Previous rheumatic fever or Kawasaki disease without valvular dysfunction
✓ Cardiac valve disease in a transplanted heart	✗ Acquired valvular dysfunction ✗ Bicuspid aortic valve
✓ Unrepaired **cyanotic** congenital heart disease or incompletely repaired congenital heart disease	✗ Simple atrial septal defect ✗ Mitral valve prolapse with regurgitation ✗ Hypertrophic cardiomyopathy
✓ Congenital heart disease repaired using **prosthetic** material ✓ **A prosthetic** heart valve ✓ Valve repair using material **prosthetic**	✗ Valve repair without prosthetic material

DIABETES

Concerns:

Delayed healing
Infections
Failure of osseointegration

Same Success rate if controlled!

Check A1c (<7)

CANCER

Surgical defects:
bone reconstruction and implants

Radiotherapy

Life time risk
Dose (> 50 Grays)
ORN
lower implant integration
HBO--- controversial

Chemotherapy

agranulocytosis

RADIOTHERAPY

No implant surgery should be carried out during radiotherapy

No implant surgery should be carried out during mucositis

Avoid immediate loading

Ensure strict asepsis

Consider antimicrobial prophylaxis

Implants placed at least 21 days prior to radiation

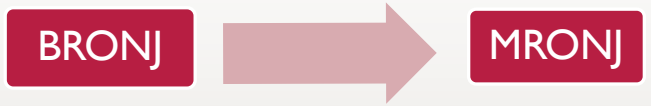
BONE DISEASE

- Few reported cases in the literature of DI placement of patients with bone diseases such as osteogenesis imperfecta, polyarthritis, or ankylosing spondylitis

- Osteoporosis is the most studied bone-related disease
  - Generalized reduction in bone mass with no other bone abnormality
  - Case–control studies reporting a weak association with risk of implant failure

MRONJ

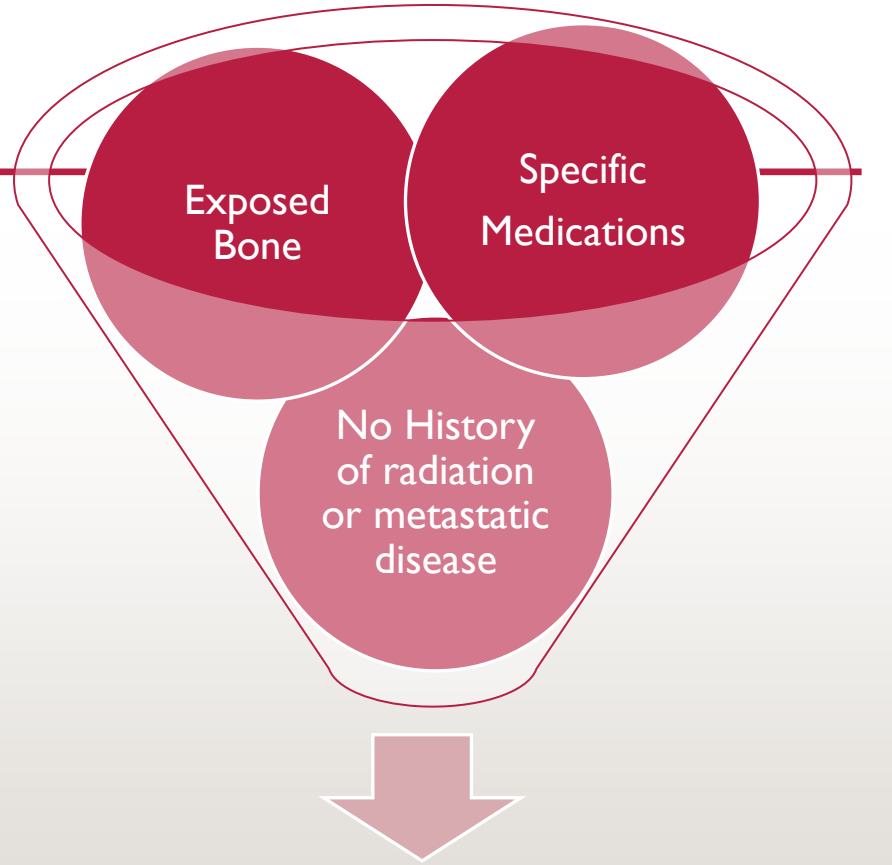
- **Medication-related osteonecrosis of the jaw**
  - avascular necrosis due to medication.



- MRONJ adversely affects the quality of life, producing significant morbidity.

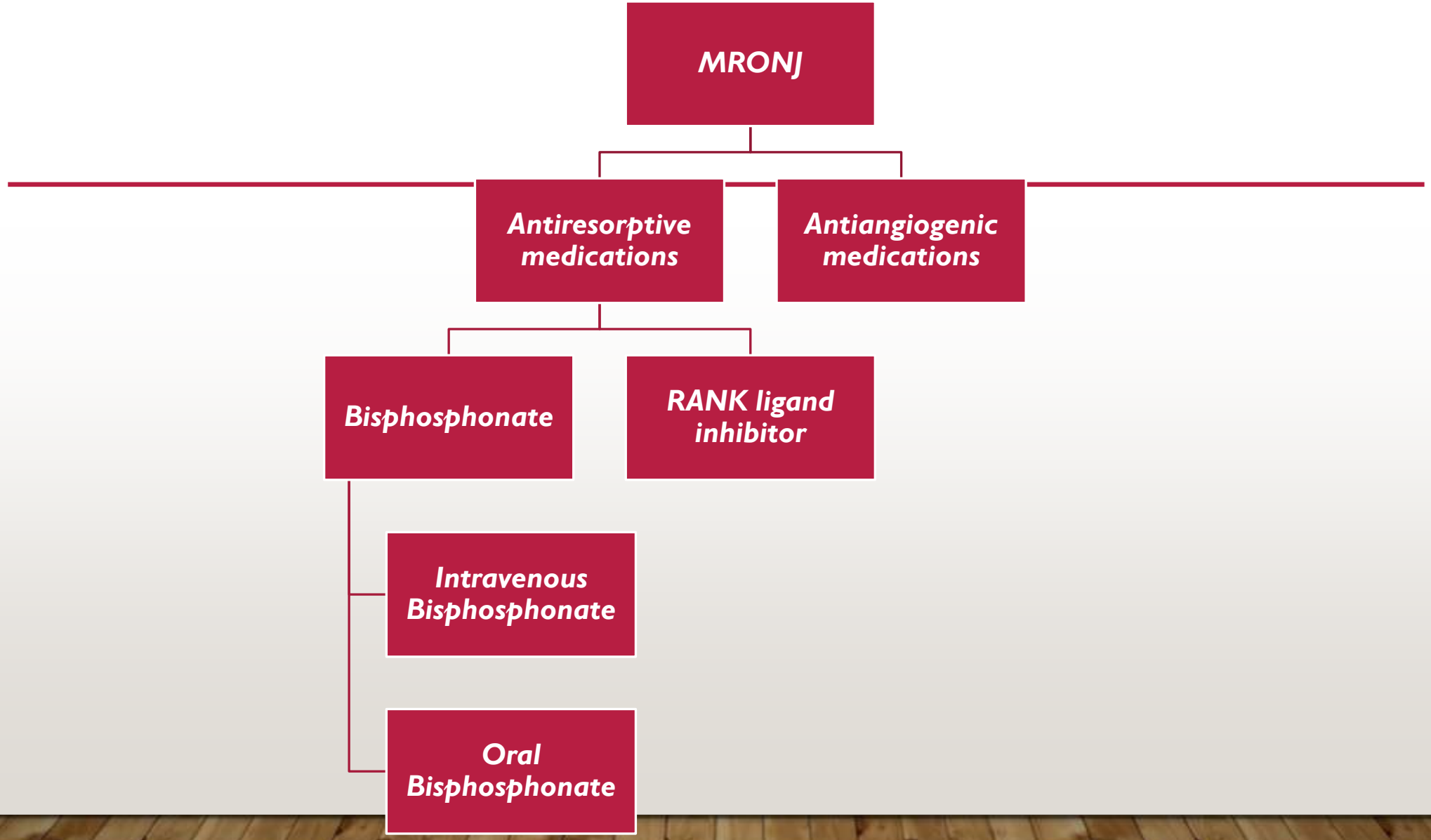
DEFINITION:

- all of the following
- 1. **Current or previous treatment** with antiresorptive or antiangiogenic agents
- 2. **Exposed bone**
  - bone that can be probed through an intraoral
  - extraoral fistula(e) in the maxillofacial region that has persisted for more than eight weeks
- 3. **No history** of radiation therapy to the jaws or metastatic disease



MRONJ may be considered

Molecule	Category	Indication	Trade name
Alendronate	Bisphosphonate	Osteoporosis	Fosamax
Bevacizumab	Humanized monoclonal antibody	Metastatic colorectal carcinoma, nonsquamous nonsmall cell lung carcinoma, glioblastoma, metastatic renal cell carcinoma	Avastin
Denosumab	Receptor activator of nuclear factor kappa-B-ligand inhibitors	Bone metastases osteoporosis	Xgeva Prolia
Ibandronate	Bisphosphonate	Osteoporosis	Boniva
Neridronate	Bisphosphonate	Osteogenesis imperfect Paget's disease of bone	Nerixia
Pamidronate	Bisphosphonate	Bone metastases	Aredia
Risedronate	Bisphosphonate	Osteoporosis	Actonel
Sirolimus	Mammalian target of rapamycin pathway	Organ rejection in renal transplant	Rapamune
Sorafenib	Tyrosine kinase inhibitors	Hepatocellular carcinoma, renal cell carcinoma	Nexavar
Sunitib	Tyrosine kinase inhibitors	Gastrointestinal stromal tumor, renal cell carcinoma, pancreatic neuroendocrine tumor	Sutent
Tiludronate	Bisphosphonate	Paget's disease of bone	Skelid
Zolendronate	Bisphosphonate	Bone metastases osteoporosis	Zometa Reclast



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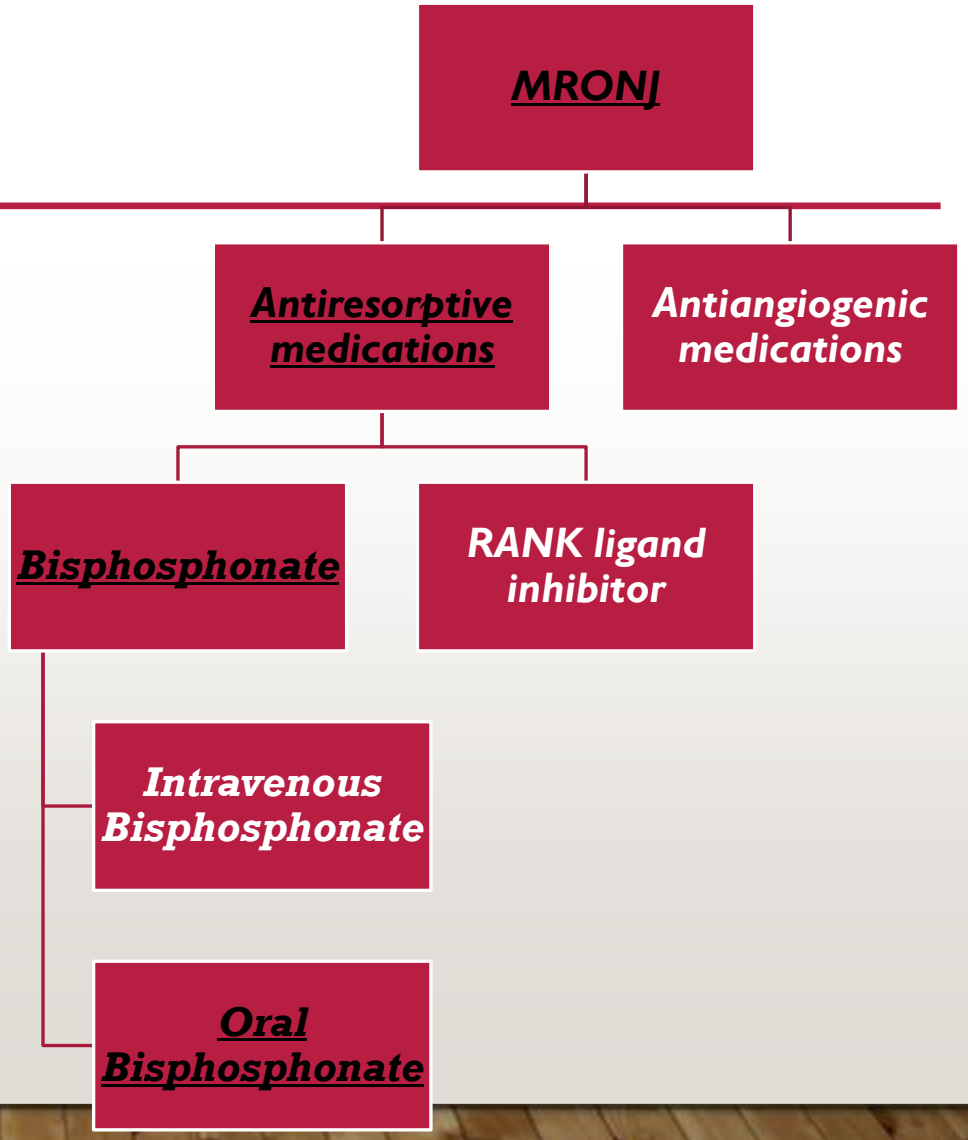
BISPHOSPHONATES

- Mechanism of action
  - Remodeling
  - Resorption
  - Osteoclastic and osteoblastic activity
- Metabolism
  - (20-80%) of absorbed bisphosphonate rapidly taken up by bone, the remainder rapidly excreted in the urine,
  - (1-10%) Intestinal absorption. It takes place by passive diffusion in the stomach and upper small intestine
  - **The half-life** appears to be very long (probably up to several years) because of this skeletal storage (skeletal retention)

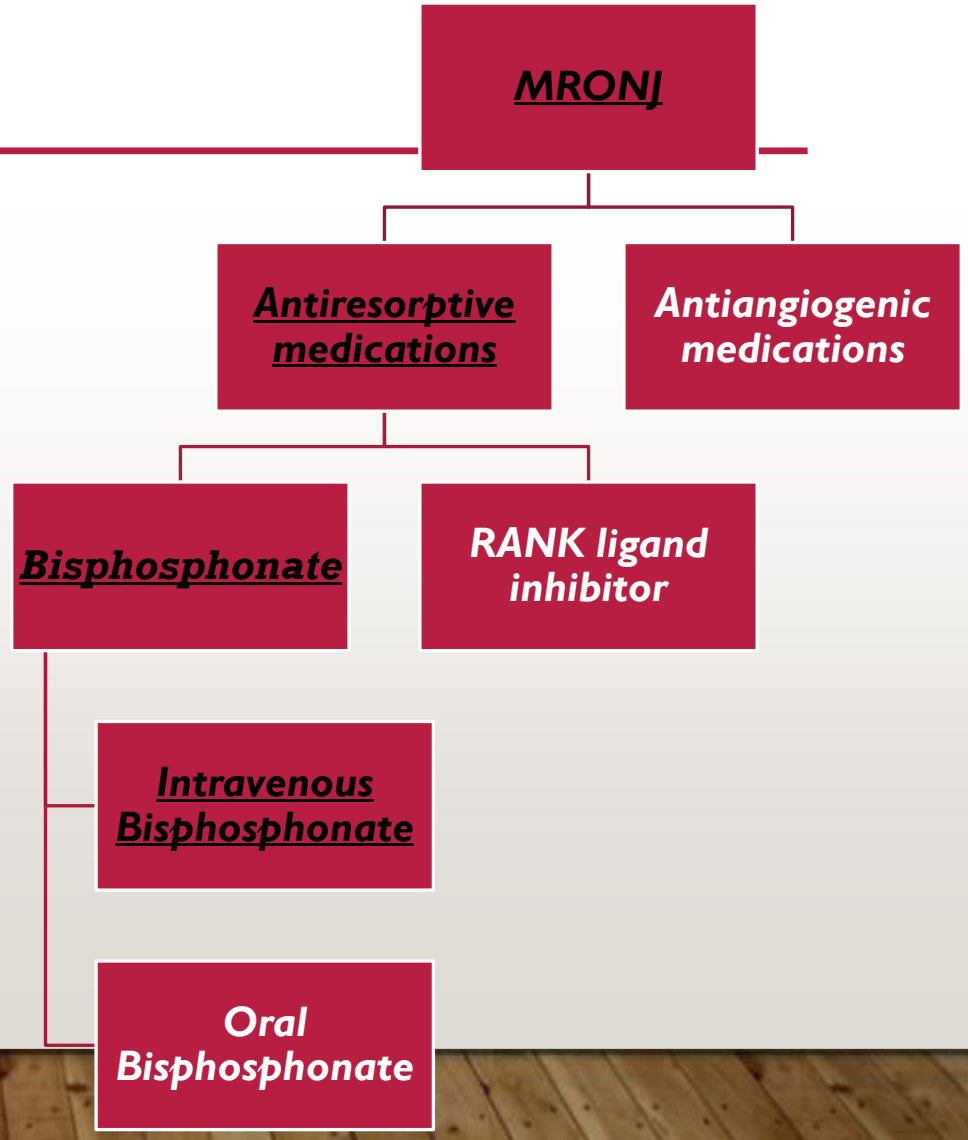
BISPHOSPHONATE

- Osteoporosis and osteopenia
- Paget's disease of bone
- Osteogenesis imperfecta
- Multiple Myeloma



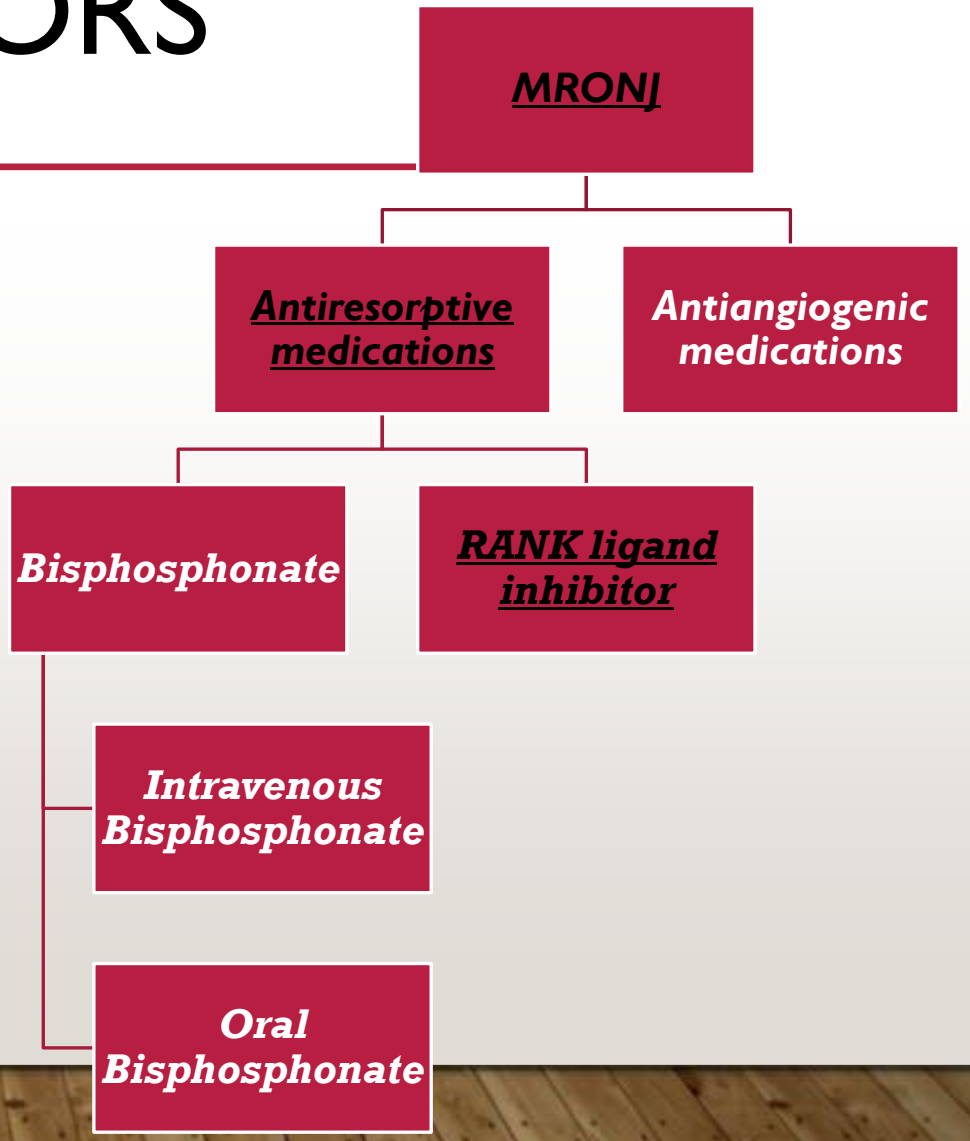
BISPHOSPHONATE

- **Oral**
  - Alendronate (Fosamax)
- **Intravenous**
  - Zolendronate (Reclast®)



RANK LIGAND INHIBITORS

- Inhibit osteoclast function
- Indicated with diseases associated with bone resorption.
- Denosumab (Prolia®)

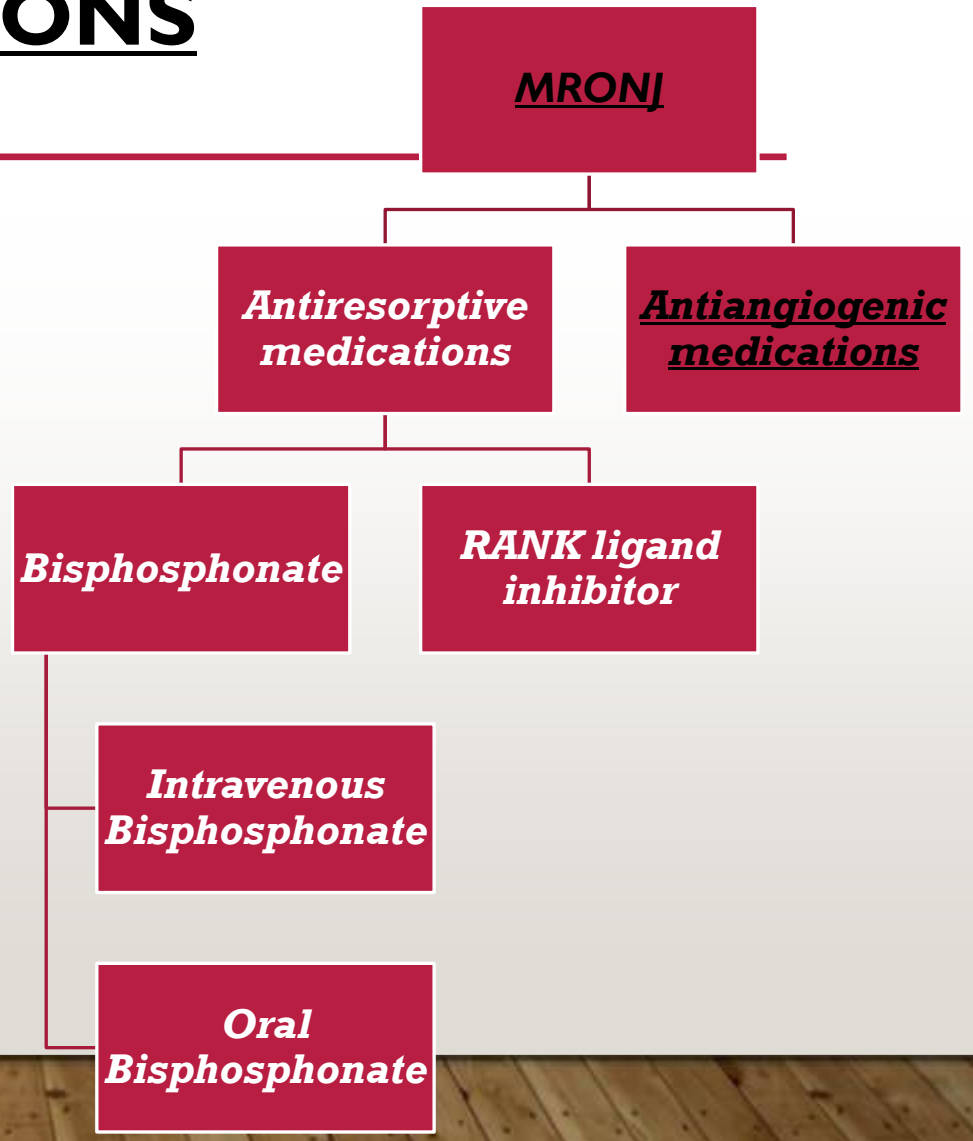


RANK LIGAND INHIBITOR

- Metabolism
  - RANK-L inhibitors do not bind to bone and their effects on bone remodeling are mostly diminished within 6 months of treatment cessation.
  - Shorter half life than Bisphosphonates.

ANTIANGIOGENIC MEDICATIONS

- Interfere with the formation of new blood vessels (Anti VEGF)
- Indicated for treatment of gastrointestinal tumors, renal cell carcinomas, neuroendocrine tumors
- Ex. bevacizumab (Avastin), sunitinib (Sutent), and sorafenib (Nexavar).



DENTAL IMPLANTS AND MRONJ

Controversial

- Absolute contraindication with IV BP
- Relative contra indication with oral bp, antiangiogentic, and rank-inhibitors
- Consider drug holiday

IMMUNOSUPPRESSED PATIENTS

Crohn's disease suggested as a relative contraindication

associated with nutritional and immune defects, may impair DI success.

Severe periodontitis is frequent in patients with congenital neutrophil deficiencies → high occurrence of peri- implant infection

Consider antibiotics prophylaxis

ALCOHOLISM

- Negative effects of alcohol intake on bone density and osseointegration in animal models
- often associated with
  - Tobacco smoking
  - Liver disease
  - Bleeding problems
  - Osteoporosis
  - Impaired immune response
  - Impaired nutrition, especially folate and B vitamins

No evidence that alcoholism is a contraindication to implants, but at increased risk of complications

TITANIUM ALLERGY

Recently, it has been suggested that titanium, formerly considered an inert material, can induce toxicity or allergic type I or IV reactions in susceptible patients and could play a critical role in implant failure.

In a systematic review including 7 studies it has been shown that titanium allergy develops among patients at every age, the most common clinical manifestations being dermal inflammatory conditions and gingival hyperplasia.

TITANIUM ALLERGY

The prevalence of titanium allergy remains unknown but it has been estimated to be 0.6% among DI patients

A significantly higher risk of positive allergic reactions was found in patients showing allergic symptoms after implant placement or unexplained implant failures

The risk of an allergy to titanium is increased in patients who are allergic to other metals

Even in confirmed titanium-allergic patients it may be possible by using alternative materials (e.g. zirconium oxide dental implants)

J Dent. 2015 May;43(5):487-98. doi: 10.1016/j.jdent.2015.03.003. Epub 2015 Mar 14.

Smoking and dental implants: A systematic review and meta-analysis.

Chrcanovic BR[1], Albrektsson T[2], Wennerberg A[3].

Author information

Abstract

OBJECTIVE: Recent studies implicate smoking as a significant factor in the failure of dental implants. This review aims to test the null hypothesis of no difference in the implant failure rates, risk of postoperative infection, and marginal bone loss for smokers versus non-smokers, against the alternative hypothesis of a difference.

DATA: Main search terms used in combination: dental implant, oral implant, smoking, tobacco, nicotine, smoker, and non-smoker.

SOURCES: An electronic search was undertaken in September/2014 in PubMed/Medline, Web of Science, Cochrane Oral Health Group Trials Register plus hand-searching.

STUDY SELECTION: Eligibility criteria included clinical human studies, either randomized or not. The search strategy resulted in 1432 publications, of which 107 were eligible, with 19,836 implants placed in smokers, with 1259 failures (6.35%), and 60,464 implants placed in non-smokers, with 1923 failures (3.18%).

CONCLUSIONS: The insertion of implants in smokers significantly affected the failure rates, the risk of postoperative infections as well as the marginal bone loss. The results should be interpreted with caution due to the presence of uncontrolled confounding factors in the included studies.

GROUP ASSIGNMENT

- Invent three hypothetical clinical scenarios where dental implants are an absolute contraindication.
- Rationalize the contraindication.