

TRAINING OF CORE TRAINERS

CPG

**Antibiotic Prophylaxis in Oral And
Maxillofacial Surgery for Prevention of
Surgical Site Infection
(3rd Edition)**



CASE DISCUSSION 1

Scenario

01



Name
Mrs. N



Age
34



Gender
Female



Medical history
NKMI, NKDA
Pregnant at
24 weeks gestation

The patient came to OMFS clinic for her scheduled appointment to remove her **impacted right third molar**.

C/o : pain on and off for 1-2 days with frequent food impaction but not associated with swelling.

HOPC:

- ▶ History of frequent pain at her lower right last tooth, which became more severe during her early pregnancy.
- ▶ She was advised to have the tooth removed during her second trimester, but patient preferred to postpone the procedure until after delivery.
- ▶ However, she has been experiencing pain on and off and finally decided to remove her tooth. She had DPT(*Dental Panoramic Tomography*) taken at GP one year ago.

Current findings:

- ▶ 3.5cm mouth opening
- ▶ No extra oral swelling noted
- ▶ Intra oral examination reveals an impacted **third molar (tooth 48)** with minimal crown seen clinically.
- ▶ Food impaction noted between 47 and impacted 48
- ▶ The surrounding soft tissues has minimal erythematous but not tender upon palpation.

Scale: 100%



7/24/24 70.0kV 10.0mA 19.1s 123.9mGy×cm²

Mrs. N's OPG

Clinical Considerations

Procedure:

- ▶ Surgical removal of the impacted right third molar under local anesthesia

Pregnancy Considerations:

- ▶ Antibiotic selection must be safe for both the mother and fetus.

Management Plan

Pre-Procedural Care:

- ▶ Confirm the patient's gestational age and obtain clearance/advise from her obstetrician.
- ▶ Plan for surgical removal of impacted 3rd molar

Question 1



Does this patient require antibiotic prophylaxis prior to the surgery?



Answer 1



YES

Answer 1



Key Message 2

Indications for AP in removal of impacted tooth to prevent SSIs are:

- **Patient's risk factor and medical history**
 - Immunocompromised conditions
 - Smoking status
- **Complexity of the surgical procedure**
 - Significant bone removal
 - Prolonged operation time >1 hour

Recommendation 2

- Antibiotic prophylaxis may be administered in impacted tooth surgery when it is indicated*.

Answer 1



May be prescribed / consider

In general the decision to administer antibiotics should be made based on individual case considerations.

Consider various local and systemic factors that may predispose to an increased risk of SSIs/complications.

Question 2



Is consultation with the patient's obstetrician required before prescribing the antibiotic?



Answer 2



Advisable

Consulting the obstetrician to ensure that there are no contraindications based on the patient's obstetric history or current pregnancy status

Key message 7

The CPG DG members opine that for pregnant women scheduled for oral and maxillofacial surgery:

- the oral healthcare provider should consult an obstetrician if necessary.
- elective procedures should be postponed until after childbirth.

Question 3



How do you determined the **choice of antibiotic prophylaxis** for this patient who is undergoing oral and maxillofacial surgery?



Answer 3

Key Message 12

The choice of AP for patients who are undergoing oral and maxillofacial surgical procedures will be determined by

- surgical site involved/ microorganism presence
- local antibiotic resistance pattern
- patient's medical condition

Question 4



What is the possible organism likely present in this patient?





Answer 4

The oral flora are dominated by bacteria consisting of

- ▶ **Aerobic gram-positive cocci**
Strep viridans (*S. mitis*, *S. Sanguinus*, *S. Salivarius*, *S. anginosus*)
- ▶ **Anaerobes**
Clostridium spp, *Prevotella*, *Fusobacterium*



Question 5



This patient requires surgical removal of the impacted 48.



If the patient require antibiotic prophylaxis, what would be the preferred antibiotic?



Answer 5

For this patient preferred choices AP is :

	PREFERRED	DOSE	ROUTE
1	Amoxycillin	1-2g	PO
2	Ampicillin	2g	IV

Recommendation 2

- Antibiotic prophylaxis may be administered in impacted tooth surgery when it is indicated*.
 - The preferred option is Amoxicillin or Amoxicillin-clavulanate.

Question 6



What could be the reason why **Amoxicillin-clavulanate** is **NOT** considered in this patient?



Answer 6

Table 1: Commonly use drugs for Antibiotics Prophylaxis Used in Oral and Maxillofacial Surgery (Pregnancy and Breast-Feeding Category).

Antibiotics	Pregnancy Category*	Breastfeeding Category
Amoxicillin	B	Acceptable
Amoxicillin-clavulanate	B (increase risk of necrotizing enterocolitis in newborn)	Acceptable

Source: Drugs and Lactation Database (LactMed®) <https://www.ncbi.nlm.nih.gov/books/NBK501922/>
Safety of Drugs in Pregnancy <https://www.mims.com/pregdef> <https://online1.mimsgateway.com.my/>

*Pregnancy category was based on Monthly Index of Medical Specialities (MIMS). **Refer to Appendix 5**

NAG 2024

Question 7



When should we give the antibiotic prophylaxis for this patient?





Answer 7

Antibiotic prophylaxis should be given
30-60 minutes prior to surgical incision

Recommendation 18

- Antibiotic prophylaxis should be given 30-60 minutes prior to surgical incision or within 120 minutes for Fluoroquinolones and Vancomycin.



Answer 7

Timing for AP is important to **ensure the serum and tissue concentrations of the AP exceed the minimum inhibitory concentration for organisms** likely to be present at the surgical site throughout the operation.

For any antibiotic prophylaxis medication, **the half-life and protein binding are the most important pharmacokinetic factors** in order to ensure appropriate blood and tissue concentration at the time of incision and during the entire surgical operation
(WHO, 2018)

Question 8



The surgery was performed successfully and completed in one hour and 30 minutes.

- Does the patient require redosing of antibiotic prophylaxis?
- What is the appropriate redosing dose?

Answer 8

NO



- ▶ the duration of surgery does not exceed the half-life of the antibiotics

Antibiotics	Recommended Redosing Interval in Adults with Normal Renal Function (From Initiation of Preoperative Dose), (hr)
Ampicillin	2
Amoxicillin-clavulanate	3
Ampicillin - sulbactam	2
Benzylopenicillin	2
Cefazolin	4
Cefuroxime	4
Clindamycin	6
Metronidazole	NA*
Azithromycin	NA*
Doxycycline	NA*

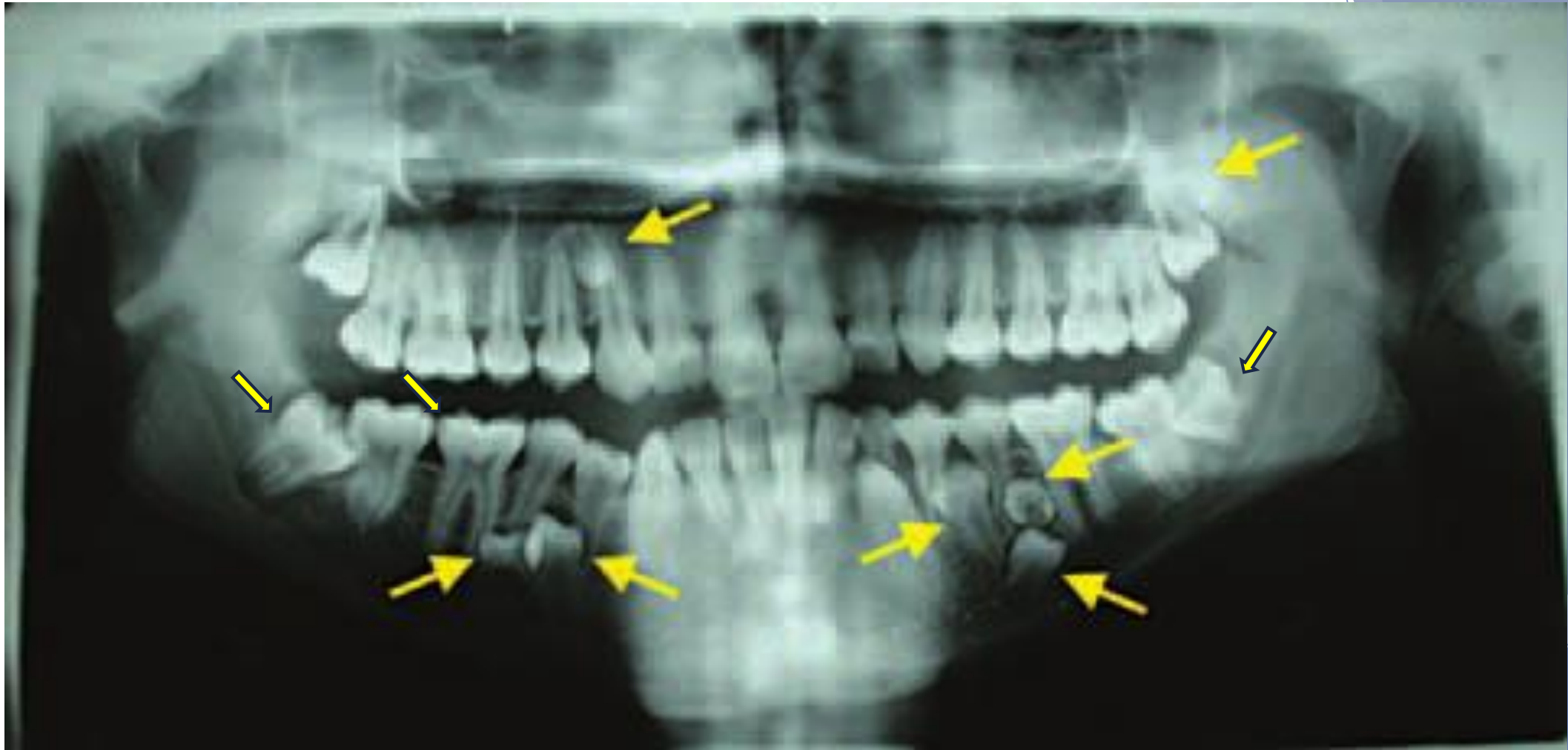
Scenario

02

Mr. Z was referred from orthodontist to remove multiple impacted teeth.

No known medical illness,
no history of drug allergy

The case was scheduled under GA



Mr. Z's OPG

Question 1



IV amoxycillin-clavulanate was given as antibiotic prophylaxis.

However, the surgery **exceeded 3 hours**, do the patient need the redosing of antibiotic prophylaxis?

Why?



Answer 1

YES

- ▶ redosing the AP intraoperatively is necessary if the duration of surgery **exceeds the two half-lives of the antibiotics** and/or there are other **conditions that could shorten the drug's half-life** (such as burns or excessive blood loss greater than 1.5L)

Antibiotics

Recommended Redosing Interval in Adults with Normal Renal Function (From Initiation of Preoperative Dose), (hr)

Ampicillin	2
Amoxicillin-clavulanate	3
Ampicillin - sulbactam	2
Benzylopenicillin	2
Cefazolin	4
Cefuroxime	4
Clindamycin	6
Metronidazole	NA*
Azithromycin	NA*
Doxycycline	NA*

***Recommended redosing intervals marked as “not applicable” (NA) are based on typical case length; for unusually long procedures, redosing may be needed**

Question 2



What is the redosing dose?

Answer 2



Recommendation 17

- Antibiotic prophylaxis should be given as a single dose and not more than 24 hours, unless specified.
- Redosing should be given if the duration of surgery exceeds the 2 half-lives of the antibiotics and should follow the initial dose given pre-operatively.

REDOSING DOSE

Question 3



Is there any other option of antibiotic for this patient ?



Answer 3

	ALTERNATIVE	DOSE	ROUTE
1	Ampicillin + Sulbactam	3g	IV
2	Cefuroxime + Metronidazole***	1.5g + 500mg	IV
3	Cefazolin + Metronidazole***	1-2g + 500mg	IV
4	Azithromycin	500mg	IV

*****For cephalosprins - To Add Metronidazole if coverage for anaerobic is needed**

ADDITIONAL INFORMATION

For procedure under local anesthesia;
the alternative of oral antibiotic other than amoxycillin / ampicillin

	ALTERNATIVE	DOSE	ROUTE
1	Cefuroxime + Metronidazole***	500MG + 400mg	PO
2	Cephalexin + Metronidazole***	2g + 400mg	PO
3	Doxycycline	100mg	PO
4	Azithromycin	500mg	PO

*** 1. For cephalosprins - To Add Metronidazole if coverage for anaerobic is needed
2. Doxycycline is not an option for pregnant women because it is category D
(has fetus risk)

ANTIBIOTICS SPECTRUM

ANTIBIOTIC CLASS	GRAM POSITIVE COCCI			ANAEROBES		GRAM NEGATIVE	
	Methicillin Sensitive Staphylococcus aureus (MSSA)	Methicillin Sensitive Staphylococci spp	Streptococcus	Clostridium	Bacteroides	E.coli	Klebsiella spp
PENICILLINS			Penicillin				
	Cloxacillin						
			Amoxicillin				
			Ampicillin				
	Amoxicillin-clavulanate						
	Ampicillin-sulbactam						
LINCOSAMIDE	Clindamycin						
IMIDAZOLE				Metronidazole			
CEPHALOSPHORIN	Cefazolin					Cefazolin	
	Cefuroxime					Cefuroxime	
MACROLIDES	Azithromycin						
TETRACYCLINE	Doxycycline						

Question 4



What alternatives are available if this patient has penicillin allergy?

Answer 4



Recommendation 16

For patients who are undergoing oral and maxillofacial surgical procedure and allergic to Penicillin:

- Cefazolin, Azithromycin or Doxycycline may be prescribed
- Cephalosporin should not be used in an individual with a history of anaphylaxis, angioedema, or urticarial with Penicillin/Ampicillin
- Clindamycin or Erythromycin may be considered with caution if other antibiotics are not available

1. **Doxycycline is not an option for pregnant women because based on pregnancy category, it is category D (has fetus risk)**
2. **Cephalexin can be prescribed as oral form to replace iv cefazolin**
3. **IV Azithromycin need to be administered via infusion over 1 hour (Bolus or IM injection is contraindicated due to risks of adverse events including arrhythmia and local irritation.)**

Question 5



Why Clindamycin is not the 1st line option for patient with allergy to penicillin?



Answer 5

Evidenced based showed Clindamycin is not effective to prevent infection in oral surgical procedure and have more adverse effects.

(Arteagoitia et al. 2022, ESC, 2023, Santamaría Arrieta et al., 2023, Basma and Misch, 2021), Boussaïd et al., 2024, Lafaurie et al., 2019)

Question 6



What antibiotics are safe to use during pregnancy/breast feeding for surgical prophylaxis?

Antibiotics	Pregnancy Category*	Breastfeeding Category
Amoxicillin	B	Acceptable
Amoxicillin-clavulanate	B (increased risk of necrotizing enterocolitis in newborns)	Acceptable
Ampicillin	B	Acceptable
Ampicillin - sulbactam	B	Acceptable
Azithromycin	B	Monitor the infant for possible Gastrointestinal (GI) effect.
Benzylpenicillin	B	Acceptable
Cefazolin	B	Acceptable
Cephalexin	B	Acceptable
Cefuroxime	B	Acceptable
Clindamycin	B	Monitor the infant for possible GI effect. Alternative may be considered for the breastfeeding
Doxycycline	D	Concern of possible staining of infant dental enamel.
Erythromycin	B	Monitor the infant for possible GI effect.
Metronidazole	B	Effect to infant is unknown. Concern of possible mutagenicity.

Antibiotic Prophylaxis in Pregnancy and Breast-Feeding Category

Alternative :
Cephalosporin + Metronidazole
Ampicillin-sulbactam

B	Either animal-reproduction studies have not demonstrated a foetal risk but there are no controlled studies in pregnant women or animal-reproduction studies have shown an adverse effect (other than a decrease in fertility) that is not confirmed in controlled studies in women in the first trimester (and there is no evidence of a risk in later trimesters).
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D	There is positive evidence of human foetal risk, but the benefits from use in pregnant women may be acceptable despite the risk (e.g. if the drug is needed in a life-threatening situation or for a serious disease for which safer drugs cannot be used or are ineffective).
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Take Home Message

- ▶ The choice of antibiotic prophylaxis should follow the antibiotic spectrum.
- ▶ Antibiotic prophylaxis should be prescribed based on clinical necessity, administered at the appropriate time and dosage, while ensuring a balanced consideration of risks, benefits, safety and costs.



THANK YOU

ANTIBIOTIC PROPHYLAXIS
ORAL AND MAXILLOFACIAL SURGERY