Antibiotics and Endodontics

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Aim

- To stop inappropriate use, over-use and abuse of antibiotics for oral and dental problems !!
  - By ALL prescribers !!
- Why?
  - To decrease the development of resistance
  - To improve our chances of treating future infections that ***REALLY DO*** need antibiotics
  - To provide appropriate treatment for rapid relief of symptoms

Antibiotics for Oral & Dental Problems

- Inappropriate use is very common
  - Up to 50% of prescriptions for human antibiotic use are unnecessary or questionable
    - → Samaranayake & Johnson - *IDJ* 1999
- Antibiotics are often used for pain relief

Antibiotic Use in Endodontics

Whitten *et al* *JADA* 1996

% of US dentists who would prescribe antibiotics for:

Condition	GDP	Endo
Acute Irreversible Pulpitis	51%	25%
Chronic Apical Periodontitis	35%	35%
Acute Apical Periodontitis	62%	67%
Chronic Apical Abscess	62%	29%
Acute Apical Abscess	95%	97%

Some - but not all !!!

Antibiotic Use in Endodontics

Segura-Egea *et al IEJ* 2010; Rodriguez-Núñez *et al JoE* 2010

% of Spanish dentists who prescribe antibiotics for:

Condition	OS	Endo
Irreversible Pulpitis	32%	12%
Irrev. Pulpitis + Acute Ap. Period.	54%	29%
Chronic Ap. Periodontitis	31%	14%
Acute Apical Periodontitis	71%	53%
Chronic Apical Abscess	60%	21%
Acute Apical Abscess	95%	94%

Some – but not all !!!

Antibiotic Use in Belgium

Mainjot *et al IEJ* 2009

% of Belgium dentists who prescribe antibiotics for:

Condition	% Dentists
Irreversible Pulpitis	6%
Periapical Abscess	83%
Cellulitis	44%
Alveolar Osteitis	42%
Periodontal Abscess	63%
Pericoronitis	52%

ALL should have AB's!!!

Antibiotic Use in Endodontics

Abbott - *AEJ* 2000

What happens in Australia ?

Condition	No. of Pt's	% had Ab's
Pulpitis	50	76 %
Infected canals + apical periodontitis	70	74 %
Non-endodontic pain	9 (Dent + Med)	100 %
	129	77 %

➔ 99 patients had been prescribed antibiotics !!!

Antibiotic Use in Endodontics

Abbott - *AEJ* 2000

Same patients when assessed by the Endodontist

Cases needing Ab's	Number	
Acute Apical Abscess	2	4/129 = 3 %
Facial Cellulitis	2	

➔ 99 patients had been prescribed antibiotics !!!

General Medical Practitioners' Knowledge and Management of Oral and Dental Problems

Biniecki E, Foote C, Gilbert G, Abbott P.

Australasian Medical Journal
2018; 11: 390 – 396.

Results – Patient Expectations

Patients' Expectations	% of Patients
To be prescribed antibiotics	80.7%
To be prescribed pain relief	78.6%
Certificate for time off work/school	22.1%
Referral to dentist	7.1%

General Medical Practitioners' Knowledge and Management of Oral and Dental Problems - Biniecki, Abbott *et al* - 2018

Results – Managing Pain

- Main management of pain by GP's
  - 79.9% - Antibiotic prescription
  - 77.7% - Referral to a dentist
  - 20.2% - Referred for investigation
    - → e.g. Radiographs, OPG, MRI, FBC
  - 9.4% - Triage of trauma

General Medical Practitioners' Knowledge and Management of Oral and Dental Problems - Biniecki, Abbott *et al* - 2018

Myths about Dental Pain

- ~~*All dental pain is because of infection*~~

FACTS: Bacteria are present in the tooth

- But the PRESENCE of bacteria does NOT imply infection

∴ ~~*Antibiotics are required*~~

FACTS: Antibiotics MIGHT help to relieve the symptoms (a little !!!)

- BUT they do NOT remove the micro-organisms !!!
- Placebo effect !!!
- OR it is just an effect of time and/or coincidence !!!

Myths about Dental Pain

- ~~*"Dental treatment cannot be done until the swelling / infection has been treated"*~~
  - Patients, doctors, nurses & some dentists !!!
- *Hence some patients will seek medical management i.e. Antibiotics !!*
  - With the MISTAKEN belief that antibiotics will "treat" the infection

Truths about Dental Pain

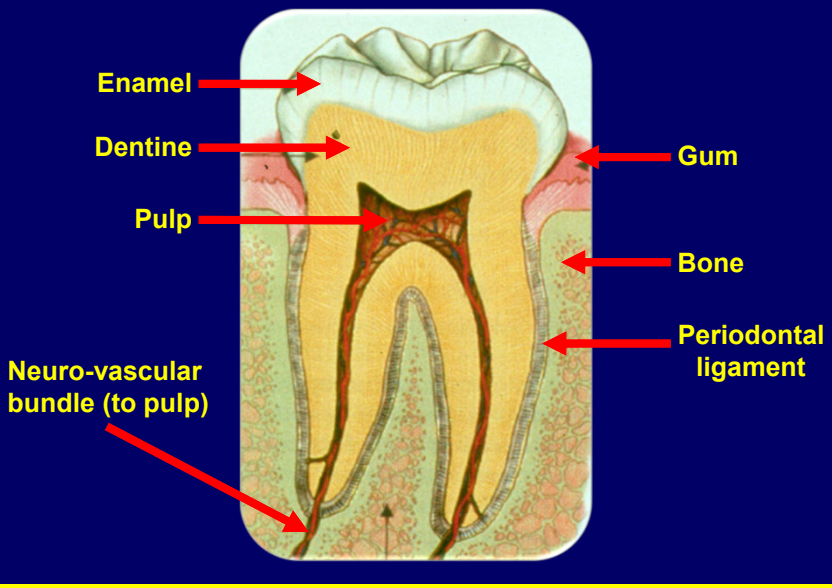
FACTS: Local (i.e. dental) treatment for dental pain is:

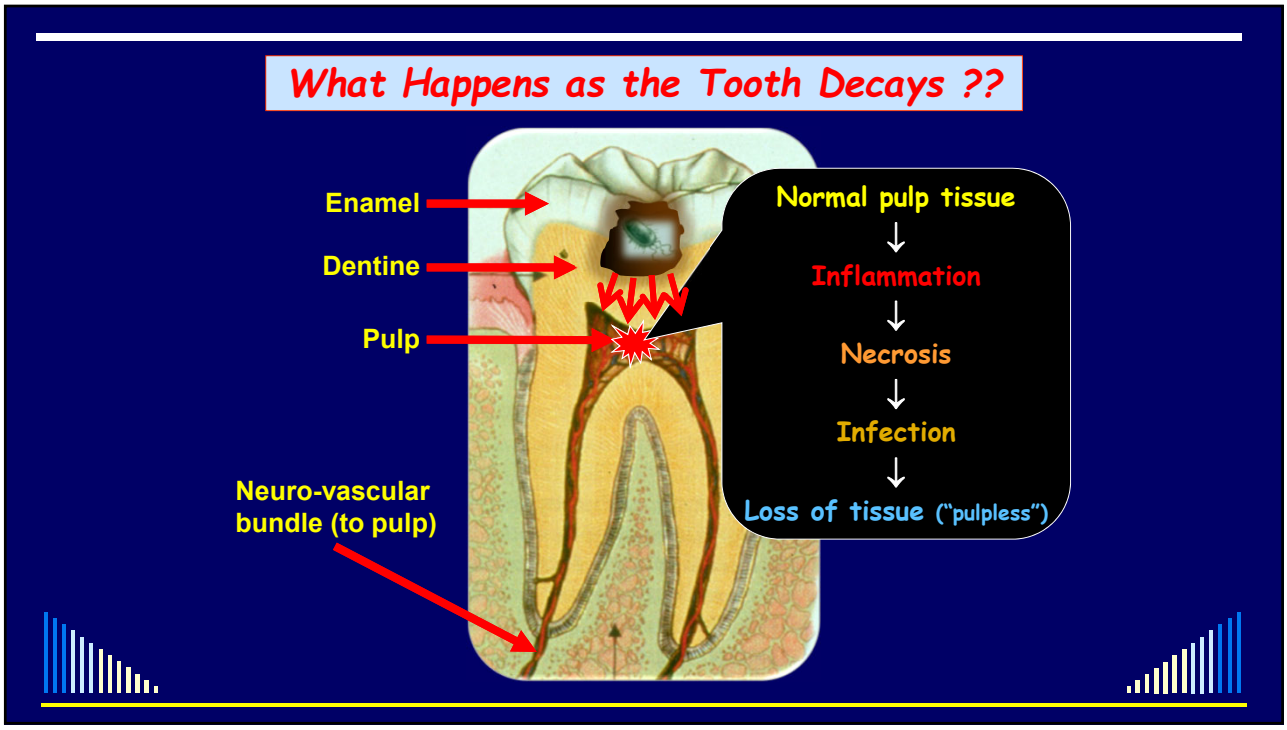
- Much quicker
- Far more effective, and
- Removes the cause of the disease

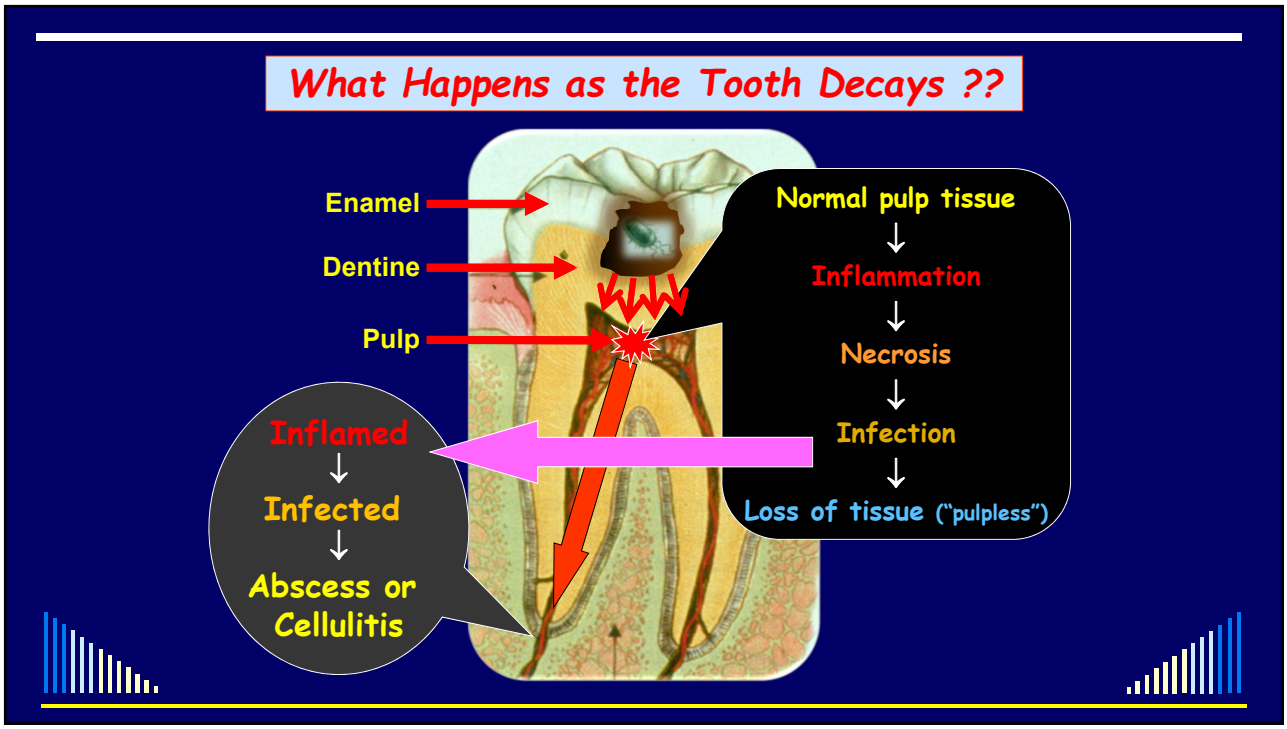
➔ ***Hence, patients need to see a dentist for PREDICTABLE and EFFECTIVE management of oral and dental pain !!!***

The basics of Dentistry …

Anatomy of a "Normal" Tooth




What Happens as the Tooth Decays ??
Enamel
Dentine
Pulp
Neuro-vascular bundle (to pulp)
Normal pulp tissue
Inflammation
Necrosis
Infection
Loss of tissue ("pulpless")


What Happens as the Tooth Decays ??
Enamel
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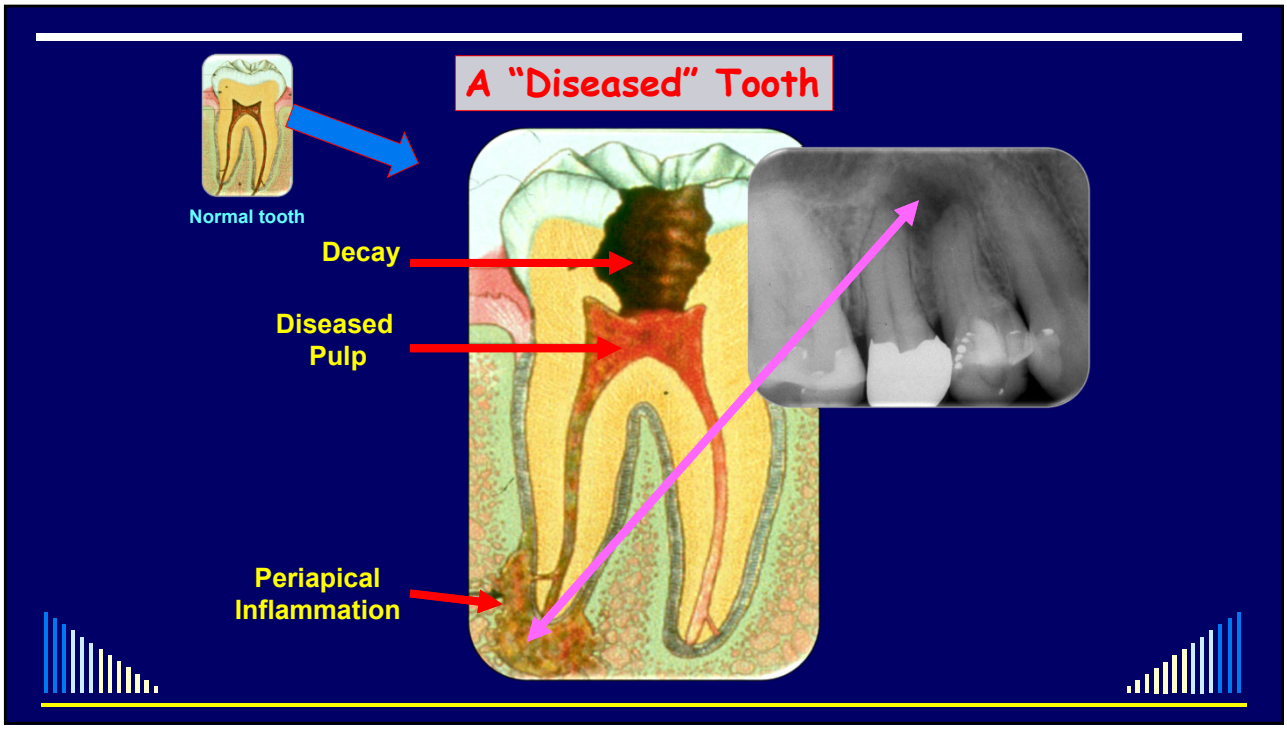
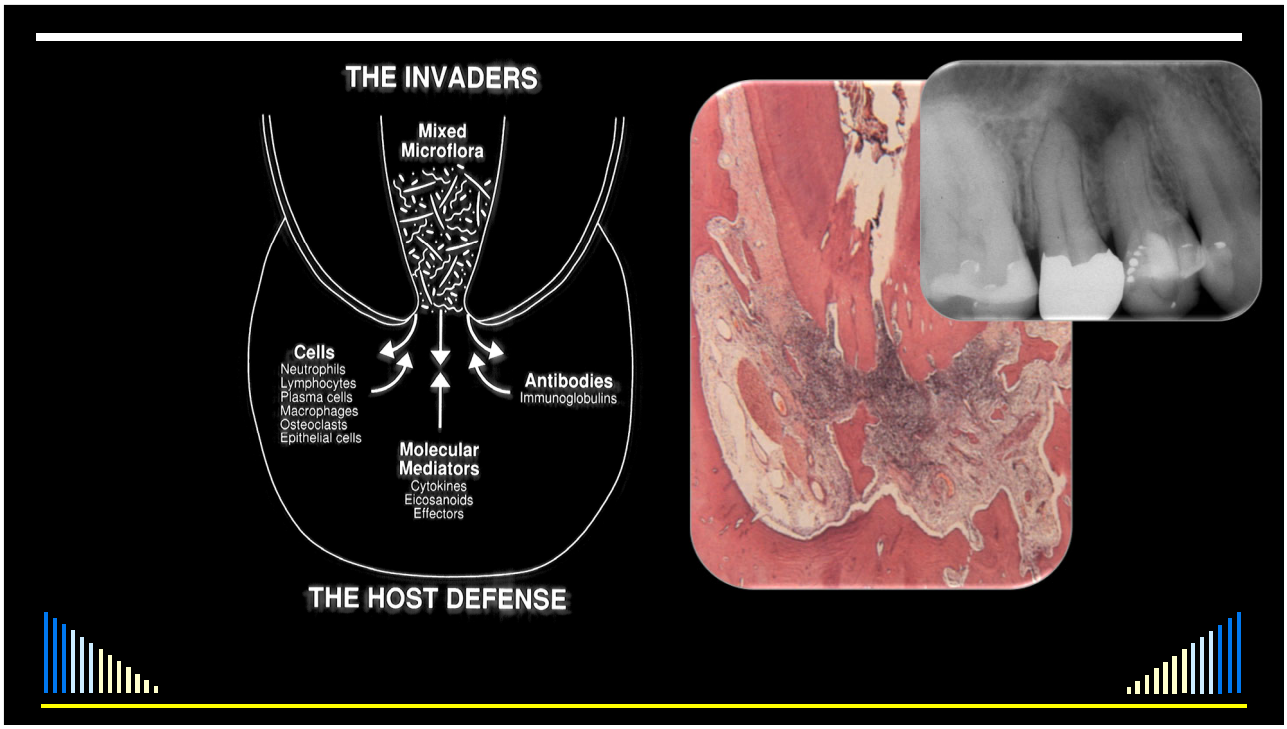
Inflamed
Infected
Abscess or Cellulitis
Normal pulp tissue
Inflammation
Necrosis
Infection
Loss of tissue ("pulpless")


A "Diseased" Tooth
Normal tooth
Decay
Diseased Pulp
Periapical Inflammation


THE INVADERS
Mixed Microflora
Cells
Neutrophils
Lymphocytes
Plasma cells
Macrophages
Osteoclasts
Epithelial cells
Antibodies
Immunoglobulins
Molecular Mediators
Cytokines
Eicosanoids
Effectors
THE HOST DEFENSE

Common Causes of Dental Pain

- *Cracked cusps*
- *Unsatisfactory or broken filling*
- *Trauma - fractures, luxations*
- *Food pack between teeth*
- *Decay - with pulpitis / apical periodontitis*
- *Temporo-mandibular joint diseases*
- *Inflamed muscles of mastication*
- *Periodontal disease*
- *Periodontal abscess*
- *Periapical abscess*

ALL these need DENTAL treatment, and NOT AB's

Not very common & ONLY SOME MIGHT require AB's

Examples of Dental Pain

1. **Pulpitis**
   - Inflammation, not infection ∴ AB's not required
   - Few, if any, bacteria are in the pulp
   - AB concentration in pulp is too low to kill bacteria

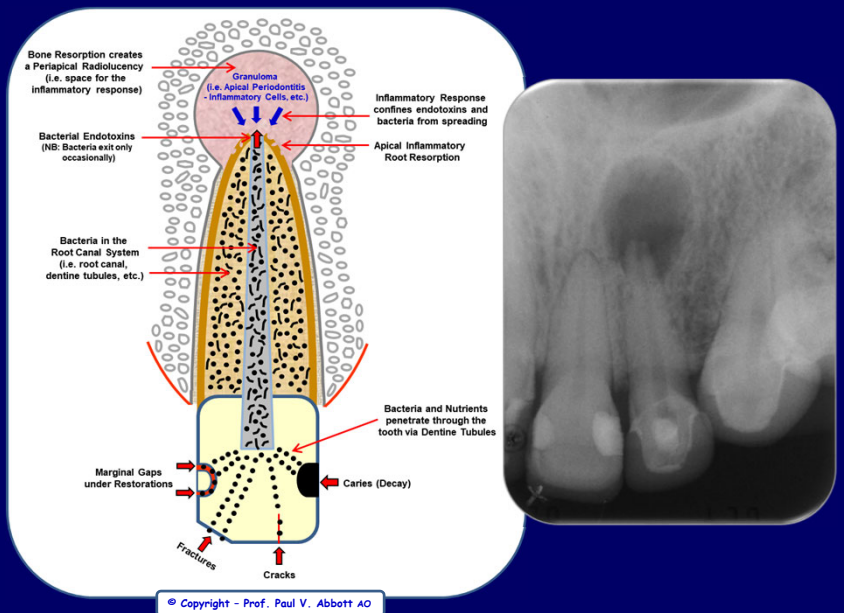
Typical Symptoms

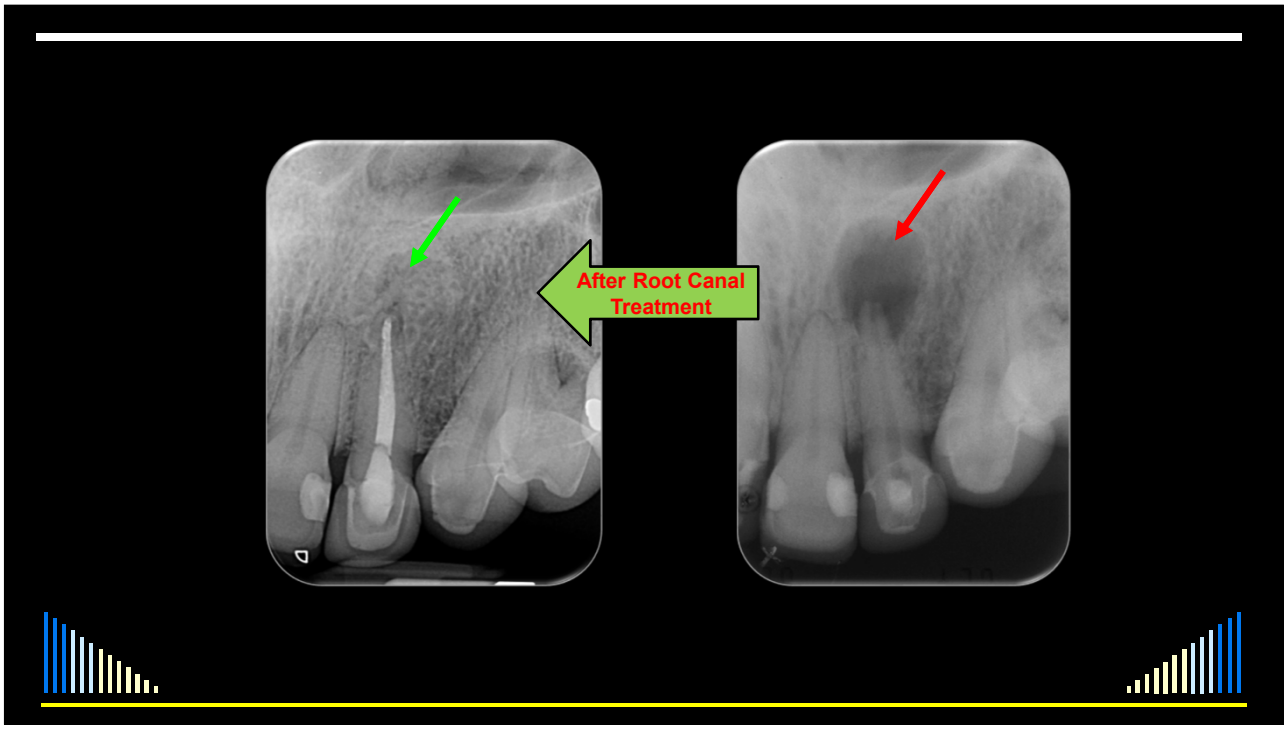
Reversible Pulpitis — MILD
- Sensitivity to cold &/or heat
- Extreme temperature change
- Sharp pain, short duration (few seconds)

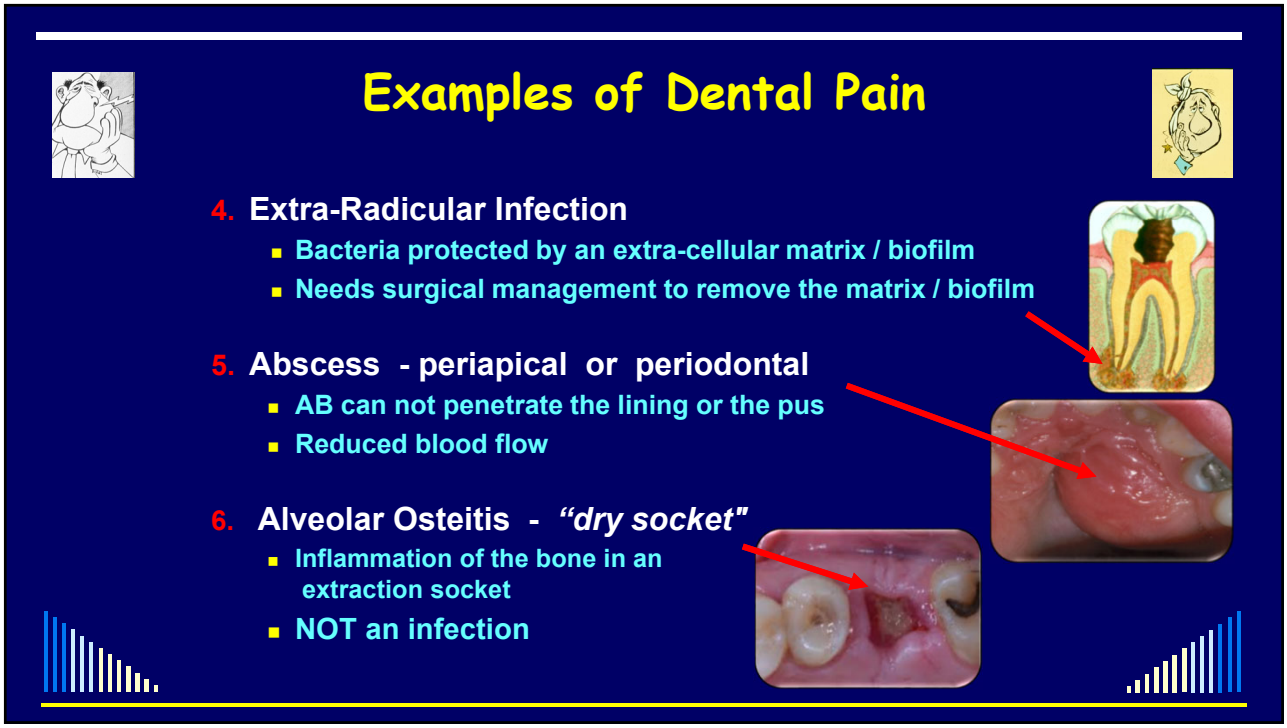
Irreversible Pulpitis — SEVERE
- Sensitivity to cold &/or heat
- Mild temperature change
- Sharp pain initially
- Then lingers - throbbing ache (> 5 mins)

Examples of Dental Pain

1. **Pulpitis**
   - Inflammation, not infection ∴ AB's not required
   - Few, if any, bacteria are in the pulp
   - AB concentration in pulp is too low to kill bacteria
2. **Infected Root Canals**
   - No blood supply to the canal ∴ no AB reaches the bacteria
3. **Apical Periodontitis**
   - Inflammation, NOT infection ∴ AB's not required




After Root Canal Treatment


Examples of Dental Pain
4. Extra-Radicular Infection
Bacteria protected by an extra-cellular matrix / biofilm
Needs surgical management to remove the matrix / biofilm
5. Abscess - periapical or periodontal
AB can not penetrate the lining or the pus
Reduced blood flow
6. Alveolar Osteitis - "dry socket"
Inflammation of the bone in an extraction socket
NOT an infection

Typical Causes of Dental Pain

- Inflammation …
  … of the pulp, bone, gum or mucosa
- ***NOT*** infection

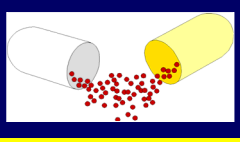
∴ AB's are ***NOT*** required

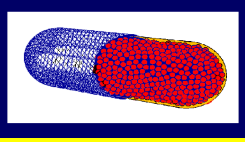
Antibiotics in Dentistry

So what is the big deal ???

What's wrong with giving AB's????

➔ Bacterial Resistance !!!





Bacterial Resistance

Lewis - Brit Dent J 2008

- Penicillin resistance within the microflora of acute dental infections
  - 5% of abscesses in 1998 ➔ 55% in 2008
- Hospital admissions for severe dental infections in the UK
  - 800 patients in 1998 ➔ 1,600 in 2008
- At least one patient per month in the UK dies from the unsuccessful management of dental infection

Bacterial Resistance

Gomes et al - J Endod 2011

- Studied antibiotic resistance of bacteria from root canal infections from 2000 – 2008
- Resistance increased for all AB's tested
  - Penicillin V, amoxicillin, clindamycin
  - Erythromycin - 100% of organisms were resistant !

Resistance: A Problem for Everyone

NPS News - No. 77; 2012

1. Australia - taking penicillin within 2 months made patients twice as likely to carry penicillin resistant strains
2. UK - transferable gene isolated from children after taking a beta-lactam AB
3. UK - children with otitis media or a respiratory infection:
   - After two weeks of AB's - 67% had resistance genes and fourfold increase in MIC
   - No AB's - no change in resistance !

Resistance: A Problem for Everyone

NPS News - No. 77; 2012

1. Widespread use of AB's promotes resistance
2. Standard AB treatments become ineffective
3. Prescribing a routine course of AB's significantly increases the likelihood of an individual carrying a resistant bacterial strain
4. Resistance persists within populations
5. The burden is shared by the whole community
6. WHO recently warned of a return to the pre-antibiotic era if bacterial resistance continues to develop unabated

"Antibiotic Resistance a Major Threat"

12th March 2013

Antibiotics resistance a major threat

Resistance to antibiotics is a 'catastrophic' global threat and should be ranked alongside terrorism as one of the biggest risks Britain faces, the government's chief medical officer says.

Sally Davies called the problem a "ticking time-bomb", saying routine hip operations could become deadly within 20 years if humans lose the ability to fight infections.

She said the issue should be put on the government's national risk register, which also includes "catastrophic terrorist attacks" and other civil emergencies.

The knighted professor urged Britain to raise the issue at a G8 foreign ministers' meeting in London next month.

"Antimicrobial resistance is a ticking time-bomb not only for the UK but also for the world," Davies said.

"We need to work with everyone to ensure the apocalyptic scenario of widespread antimicrobial resistance does not become a reality.

"This threat is arguably as important as climate change for the world."

VIDEOS

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US shooting mourners evacuated after bomb threat

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"Antibiotic Apocalypse"

19th May 2016

theguardian

England's chief medical officer warns of 'antibiotic apocalypse'

Efficiency of antibiotics falling as deaths in EU and US hit around 50,000 annually from infections drugs can no longer treat

Sarah Boseley Health editor

Thursday 19 May 2016 09.01 AEST

The "antibiotic apocalypse" may already be upon us. According to Dame Sally Davies, chief medical officer for England, 50,000 people are dying every year in Europe and the US from infections that antibiotics have lost the power to treat.

Davies has been at the forefront of the UK's efforts against antimicrobial resistance (AMR) and taken on a global leadership role. She has described the threatened loss of antibiotics to the world as on a par with terrorism and climate change.

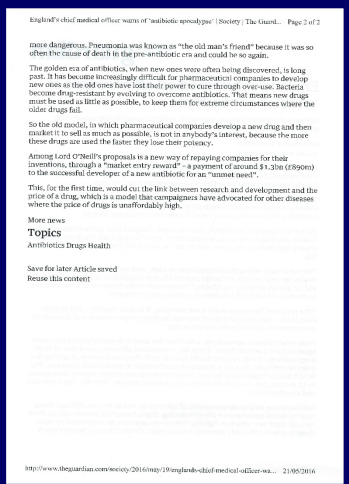
As the final report of Jim O'Neill, the economist charged by the prime minister with finding solutions to the crisis, was published, Davies warned that the death toll was already high and our life spans, which once seemed to be forever lengthening, may fall.

"We are already seeing the consequences of AMR, with estimates of around 50,000 deaths per year recently in Europe and the US, due to antibiotic resistant infections, and far greater numbers worldwide," Davies wrote in the foreword to a report by the Institute and Faculty of Actuaries on antimicrobial resistance.

"The projected figures are much more worrying. It is quite possible - and perhaps even likely - that the recent era of material mortality improvements will give way to many years of material mortality worsening."

From tuberculosis to gonorrhoea, infections that used to be easily treated have once again become a serious threat. There are an estimated 480,000 cases a year of multi-drug resistant TB and 150,000 deaths from it. MDR-TB is hard to treat, requiring two years of antibiotics that are not available or affordable in some poorer countries. The World Health Organisation has just recommended a new shorter regime, lasting nine to 12 months, but cases of extremely drug resistant disease – XDR-TB – have emerged and are often lethal.

Antibiotics are vital in the prevention of infection as well as its cure. Without them, surgery would again become life-threatening. Organ transplant patients rely on them because their own infection-fighting immune system must be suppressed by other drugs to prevent the body rejecting a donor organ. Childbirth could become much



more dangerous. Pneumonia was known as "the old man's friend" because it was so often the cause of death in the pre-antibiotic era and could be so again.

The golden era of antibiotics, when new ones were often being discovered, is long past. It has become increasingly difficult for pharmaceutical companies to develop new ones as the old ones have lost their power to cure through over-use. Bacteria become drug-resistant by evolving to overcome antibiotics. That means new drugs must be used as little as possible, to keep them for extreme circumstances where the older drugs fail.

So the old model, in which pharmaceutical companies develop a new drug and then market it to sell as much as possible, is not in anybody's interest, because the more these drugs are used the faster they lose their potency.

Among Lord O'Neill's proposals is a new way of repaying companies for their inventions, through a "market entry reward" – a payment of around $1.3bn (£890m) to the successful developer of a new antibiotic for an "unmet need".

This, for the first time, would cut the link between research and development and the price of a drug, which is a model that campaigners have advocated for other diseases where the price of drugs is unaffordably high.

More news

Topics

Antibiotics Drugs Health

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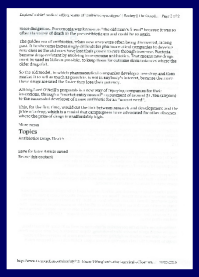
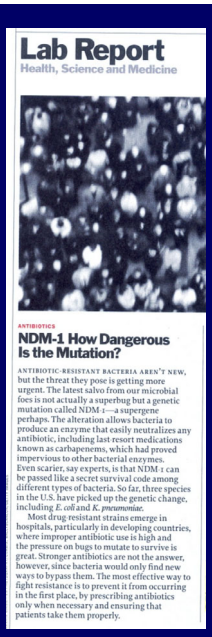
"Antibiotic Apocalypse"

19th May 2016

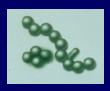


- *"The 'antibiotic apocalypse' may already be upon us"*
  - Dame Sally Davies, England's Chief Medical Officer
- *"We are already seeing the consequences of AMR"*
- **50,000 people are dying every year in Europe and the US from infections that antibiotics have lost the power to treat**
- **Worldwide estimate of 480,000 cases a year of multi-drug resistant TB with 190,000 deaths**
- **Conditions such as childbirth, pneumonia, gonorrhoea are becoming serious threats**



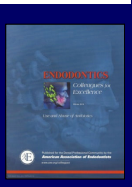
Bacterial Resistance

- Resistance - Four levels to consider:
  - The individual bacteria
  - Other bacterial species
  - The individual person
  - Other people:
    - → Locally, nationally, globally

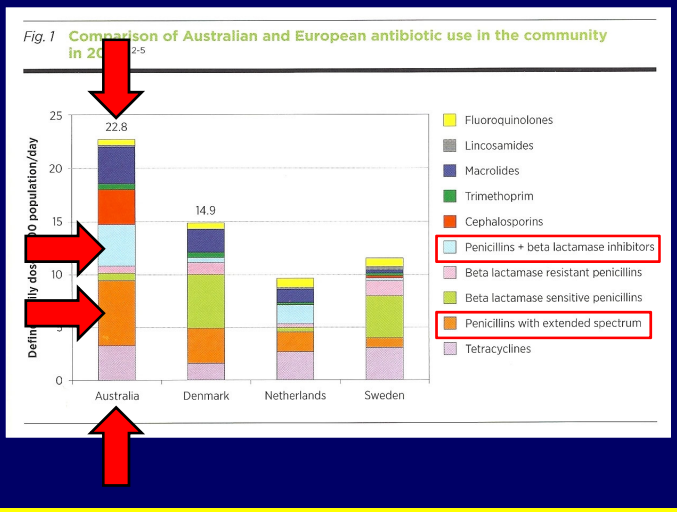
Bacterial Resistance

AAE Colleagues for Excellence - Winter 2012



- Norway - report strongly suggests that bacterial resistance can be reversed
- Norway does not have the "killer superbug" (i.e. *staphylococcus*) infections
- The reason?
  - A "simple solution" -
    - → Norway stopped doctors from using AB's when they were not indicated
    - → Treat fever with paracetamol and "wait and see" (e.g. common cold)

Antibiotic Use



Antibiotic Use

Australian Prescriber
VOLUME 38 · NUMBER 4 · AUGUST 2015

ARTICLE

Controlling *Clostridium difficile*

SUMMARY

Clostridium difficile infection causes colitis and is closely associated with the use of antimicrobials, probably due to disruption of the normal bowel flora.

Avoiding inappropriate antimicrobial use is the most important way to prevent this potentially life-threatening infection.

Emergent hypervirulent variants of *C. difficile* are associated with increased transmission, morbidity and mortality and have caused epidemics in North America and Europe. Cases have also been reported in Australia so intensified surveillance and antimicrobial stewardship is more important than ever.

While any antimicrobial can precipitate *C. difficile*, fluoroquinolones, clindamycin and cephalosporins are particularly implicated.

Other drugs, such as proton pump inhibitors, have also been associated with an increased incidence of *C. difficile*.

Severe disease is managed in hospital. For non-severe disease, treatment generally includes supportive measures and treatment with oral metronidazole. Relapse is common.

Introduction

Infection with the toxigenic anaerobe *Clostridium difficile* causes diarrhoea and colitis. Less commonly it causes toxic megacolon, colonic perforation and death. Disease is caused by two exotoxins – A and B – which rank among the most potent bacterial toxins described.

Older people with comorbidities are more often infected and have a poorer outcome. Risk factors for *C. difficile* infection are listed in Box 1.[1–4] With the emergence of hypervirulent strains associated with increased mortality, *C. difficile* has moved from an uncommon hospital acquired infection to a global public health concern.

C. difficile infection is closely associated with antimicrobial use. Consequently, any clinician who prescribes or dispenses antibiotics has an important role in preventing this potentially life-threatening and often avoidable infection.

Epidemiology

Although first described in 1935, the clinical importance of *C. difficile* was not recognised until several patients died from fulminant colitis after receiving clindamycin in the 1970s. The incidence and severity of *C. difficile* has increased substantially in the last 20 years in the developed world. This trend is most prominent in elderly people in hospital and is increasingly recognised in residential aged-care facilities. In the USA, *C. difficile* is now the 18th leading cause of death in those over 65 years old.[1]

There is also an increased incidence of *C. difficile* infection outside of healthcare facilities. In a targeted surveillance program in Victoria, 16% of *C. difficile* cases were community-associated.[2] Of cases identified in Queensland, 37% had community-onset diarrhoea (unpublished data). Similarly, in surveys in the USA, up to 41% of cases were not associated with recent hospitalisation.[3]

In Australia, there is no published evidence of increasing incidence of *C. difficile* infection. However, until recently there was no uniform diagnostic approach or surveillance.[4] In Victoria, between October 2010 and March 2011 there were 370 healthcare-associated cases (17 per 10 000 occupied bed days).[4]

Outbreaks of hypervirulent C. difficile

In 2005 a novel strain of *C. difficile*, now known as PCR ribotype 027, led to an outbreak of severe diarrhoea and markedly increased mortality in hospitalised patients in Quebec, Canada.[5] Cases were significantly more likely to have received fluoroquinolones, in particular moxifloxacin and

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Key words
antibiotics, colitis, diarrhoea, infection

Aust Prescr 2015;38:121–4

First published online
26 May 2015

Box 1 Risk factors for *Clostridium difficile* infection * *

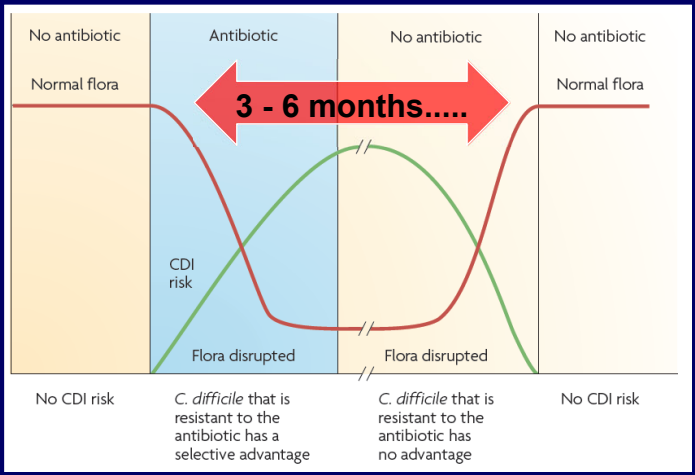
- Current or recent antimicrobial exposure (within 12 weeks)
- Use of proton pump inhibitor or H_2 receptor antagonist
- Current or recent hospitalisation (within 2 months)
- Chemotherapy
- Older age
- Medical comorbidities[1]
- Previous *C. difficile* infection, especially relapsed disease
- Use of diclofenac

* Up to 25% of community-acquired cases occur without established predisposing risk factors;[1] therefore stool testing should be considered for community-acquired diarrhoea

Full text free online at www.australianprescriber.com

Effect of Antibiotics on Normal Flora

Rupnik *et al.* Nat Rev Microbiol 2009; 7: 526-36



Managing Dental Pain

The 3-D's

1. **D**iagnosis
2. **D**ental Treatment
3. **D**rugs

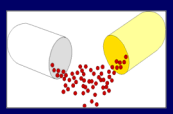
Managing Dental & Oral Pain

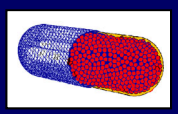
- Drugs / Medication
  - Local
    - Used in or around teeth, gingiva, mucosa, etc.
  - Systemic
    - Anti-inflammatory
    - Analgesics
    - Anti-microbial
      - Antibiotics
      - Anti-fungal
      - Anti-viral

Antibiotic Use for Dental Pain

- Antibiotics do not *CURE* dental infections
- They *ASSIST* the body's defense mechanisms to overcome the bacterial attack

∴ Only needed when the body's efforts are failing





Antibiotic Use for Dental Pain

- Antibiotics do not *CURE* dental infections
- They *ASSIST* the body's defense mechanisms to overcome the bacterial attack

∴ Only needed when the body's efforts are failing

- Signs of failure:
  - ➔ Fever, malaise, cellulitis, progressive swelling, lymph node involvement and trismus

Antibiotic Use for Dental Pain

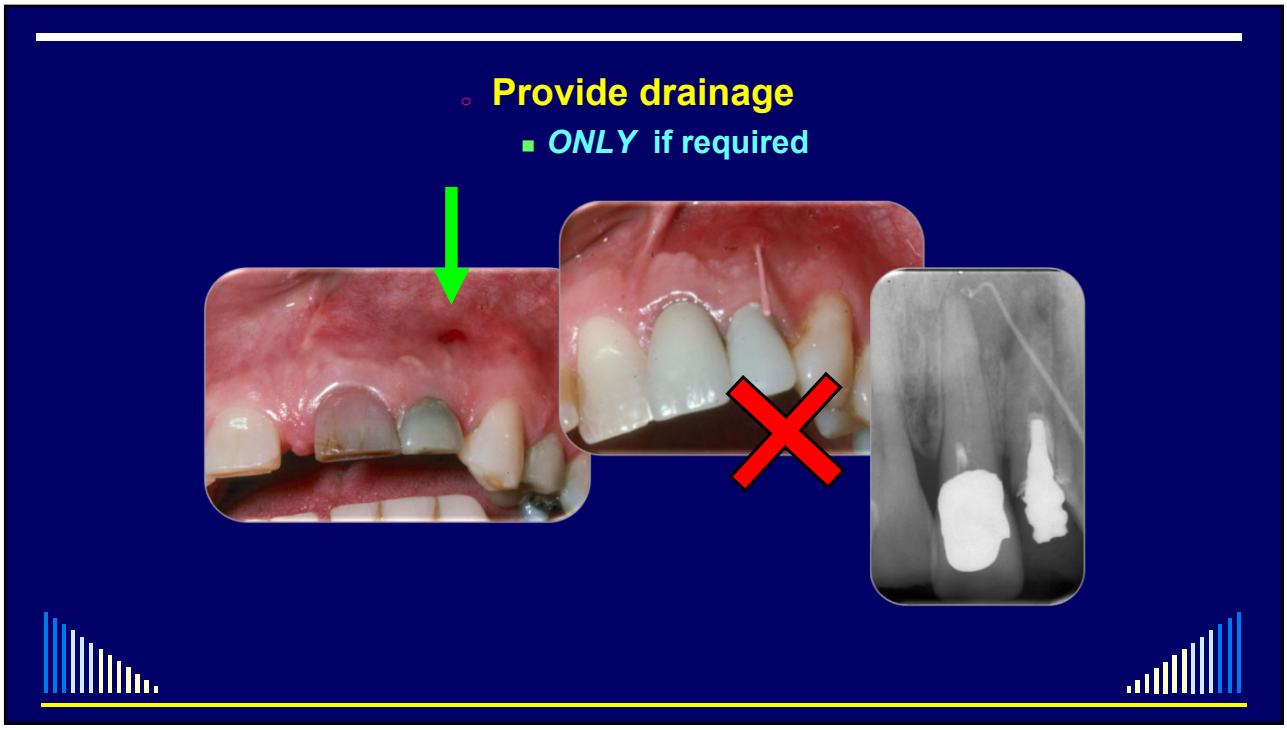
- Orofacial infections can be effectively treated by:
  - Removing as many organisms as possible
  - Drainage of pus

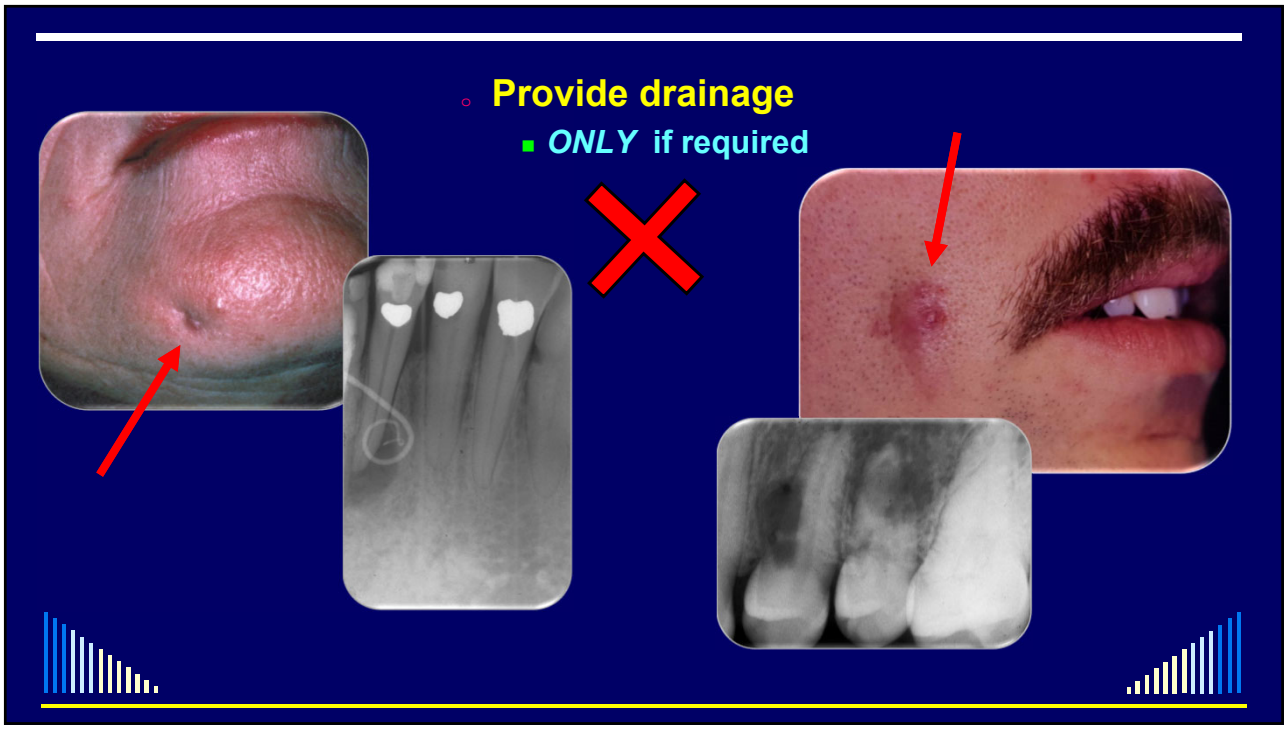
Antibiotic Use for Dental Pain

- Orofacial infections can be effectively treated by:
  - Removing as many organisms as possible
    - ➔ Reduces demand on body's defense mechanisms
    - ➔ Reduces the number of resistant strains
  - Drainage of pus

Antibiotic Use for Dental Pain

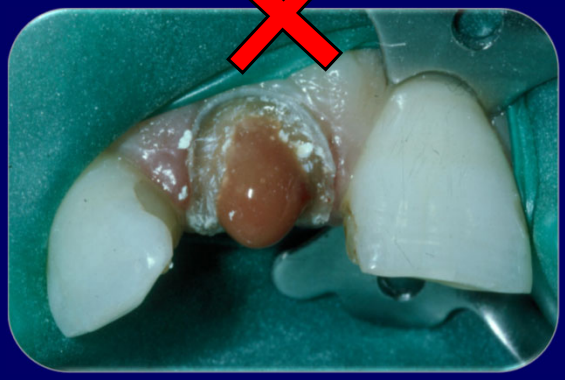
- Orofacial infections can be effectively treated by:
  - Removing as many organisms as possible
    - ➔ Reduces demand on body's defense mechanisms
    - ➔ Reduces the number of resistant strains
  - Drainage of pus
    - ➔ Since abscesses reduce blood flow to the area
      - Which limits AB distribution to the region


Provide drainage
ONLY if required


Provide drainage
ONLY if required

- Provide drainage
  - *ONLY* if required

- Provide drainage
  - *ONLY* if required
  - Via the root canal



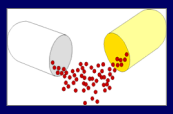
- **Provide drainage**
  - *ONLY* if required
  - Via the root canal
  - Or via soft tissue incision

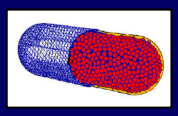
Principles of Antibiotic Use for Dental and Oral Infections

- **Indications for antibiotics in Dentistry**
  - There are very few ***REAL*** indications
  - Antibiotics should only be considered as an ***ADJUNCT*** to dental treatment
  - Reserve AB's for special circumstances
  - Use locally rather than systemically
    - → i.e. Topically, intra-dentally, etc

Antibiotic Use for Dental Infections

- Systemic use of AB's should be limited to:
  - Patients showing signs of malaise
    - → Elevated body temperature
    - → Lymph node involvement
  - Suppressed or compromised immune system





Antibiotic Use for Dental Infections

- Patient's general resistance affected by:
  - Drugs
  - Old age
  - Anxiety
  - Alcoholism
  - Malnourishment
  - Systemic diseases
  - Other infections, etc

ALL can cause suppression of the immune response

Antibiotic Use for Dental Infections

- Systemic use of AB's should be limited to:
  - Patients showing signs of malaise
    - → Elevated body temperature
    - → Lymph node involvement
  - Suppressed or compromised immune system
  - Cellulitis or spreading infection
  - Rapid onset (<24 hours) of severe infection
    - → To avoid possible complications of the infection

Antibiotic Use for Dental Infections

- Possible complications from dental infections:
  - Bacterial endocarditis
  - Cavernous sinus thrombosis
  - Orbital cellulitis
  - Ludwig's angina
  - Brain abscess
  - Mediastinitis
  - Osteomyelitis

Antibiotic Use for Dental Infections

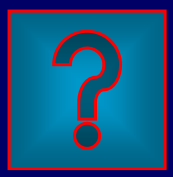
- Strategies for the use of antibiotics:
  - Choose appropriate, narrow spectrum AB
  - High initial dose - double "normal" dose
  - Consider IM or IV - if severe infection
  - Commence ASAP
  - Monitor progress of the patient daily
    - → If no improvement seen after 24 - 48 hours
      - Consider further / different dental treatment
      - Consider using a different AB

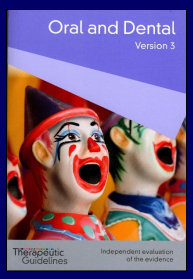
Antibiotic Use for Dental Infections

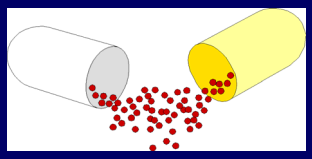
- For how long should antibiotics be used?
  - The correct time is the time that it takes for the host's defense mechanisms to regain control
    - → Evidenced by subsiding systemic manifestations
  - Oro-facial infections rarely rebound once the source of bacteria is reduced / removed
    - → Continue AB's only for 1 - 2 days after the signs of the infection diminish
      - Usually only need 4-5 days (total)

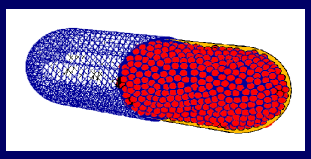
Antibiotic Use for Dental Infections

Which antibiotic should be used?





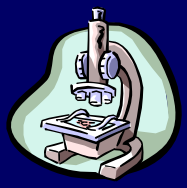




Antibiotic Use for Dental Infections

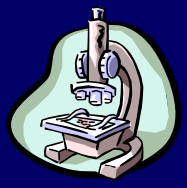
Which antibiotic should be used?

- **Decision should be based on the type of organisms present**
  - **Microbiological analysis**



Antibiotic Use for Dental Infections

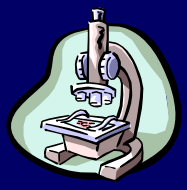
Microbiological Analysis



- Ideally should be done for *ALL* cases when AB's are being considered
  - To identify the bacteria
  - To test susceptibility to antimicrobial agents

Antibiotic Use for Dental Infections

Microbiological Analysis



- Practical Problems
  - Difficulties with anaerobic culturing
    - → Time involved
    - → Experience required for accurate identification
  - Costs
  - Treatment usually resolves the disease before the results can be obtained

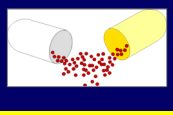
Antibiotic Use for Dental Infections

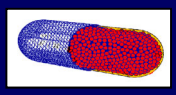
Which antibiotic should be used?

- Decision should be based on the type of organisms present
  - Microbiological analysis
- Type of organisms usually not known
  - Clinically - in any particular case

∴ Assumptions are made clinically

- Based on research reports about the commonly found organisms



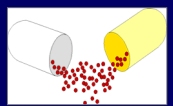


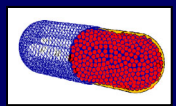
Susceptibility to Antibiotics

Baumgartner & Xia - *J Endod* 2003

Bacteria from Periapical Abscesses

- Penicillin V - 85%
- Amoxicillin - 91%
- Amoxicillin + Clavulanic Acid - 100%
- Clindamycin - 96%
- Metronidazole - 45%
  - → And had the greatest amount of resistance
- Metronidazole + Penicillin - 93%
- Metronidazole + Amoxicillin - 96%



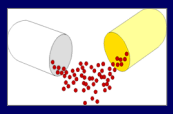


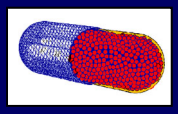
Susceptibility to Antibiotics

Skucaite *et al* - *J Endod* 2010

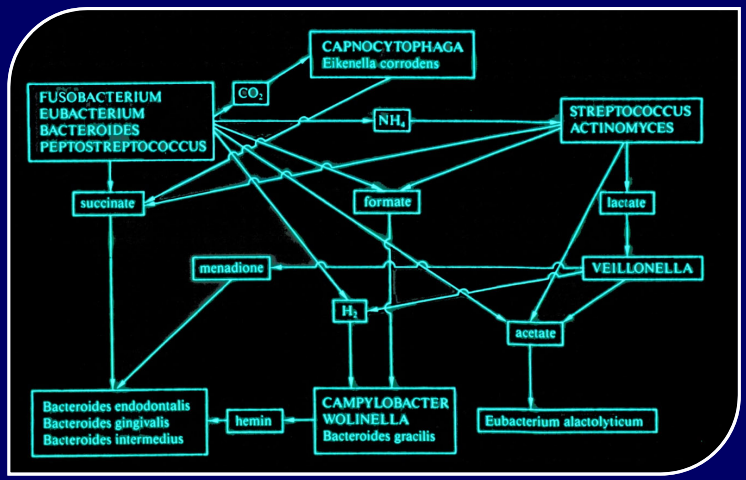
Bacteria from Root Canals or P-ap. Abscesses

- Penicillin - 81% (+ 17.4% intermed. suscept.) **98.4%**
- Amoxicillin - 84% (+ 16.3% intermed. suscept.) **100%**
- Amoxicillin + Clavulanic Acid - 100%
- Clindamycin - 74%
- Metronidazole - 44%
- Erythromycin - 55%
- Tetracycline - 60%

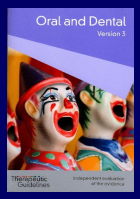




Bacteria Exist as Communities



Principles of Antibiotic Use for Dental and Oral Infections



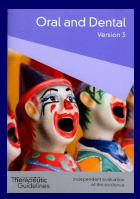
The Antibiotic Creed - *"MIND ME"*

M **M**icrobiology guides therapy wherever possible
I **I**ndications should be evidence-based
N **N**arrowest spectrum required
D **D**osage appropriate to site and type of infection

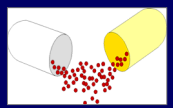
M **M**inimise duration of therapy
E **E**nsure monotherapy in most situations

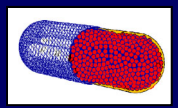
Antibiotic Use for Dental Infections

Which antibiotic should be used?



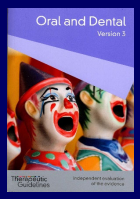
- **Penicillin V**
  - First choice oral AB for most odontogenic infections (especially gram +ve organisms)
    - Narrow - *but appropriate* - spectrum
  - 1000 mg loading dose
  - Then: 500 mg every 6 hrs, 1 hr before meals Á 5 days



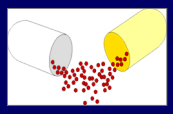


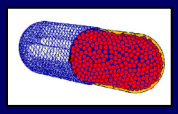
Antibiotic Use for Dental Infections

Which antibiotic should be used?



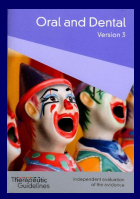
- **Metronidazole**
  - Second choice oral antibiotic
    - especially if anaerobic bacteria suspected
      - → *Has synergistic reaction with penicillin*
  - 800 mg loading dose
  - Then: 400 mg every 12 hrs Á for 5 days



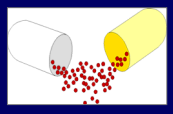


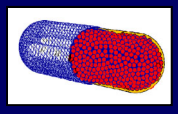
Antibiotic Use for Dental Infections

Which antibiotic should be used?



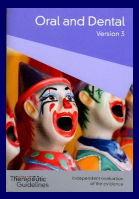
- **Clindamycin**
  - First choice oral antibiotic - if patient is allergic to penicillin
    - → Very good spectrum of antibacterial action against oral organisms
  - 300 mg loading dose
  - Then: 150 mg every 8 hrs Á for 5 days



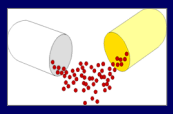


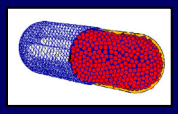
Antibiotic Use for Dental Infections

Which antibiotic should be used?



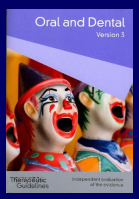
- **Amoxicillin**
  - **For prophylaxis**
    - **e.g. Against infective endocarditis**
  - **Latest guidelines: 2 gm one hour pre-op.**
    - **Use clindamycin 600 mg 1 hr pre-op if pt. has a history of allergy to the penicillins**
  - **Follow published guidelines**
    - ***Constantly changing !!!***



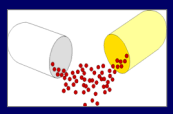


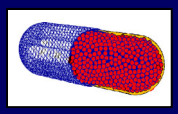
Antibiotic Use for Dental Infections

Which antibiotic should be used?



- **Tetracycline**
  - **Research shows it is the AB of choice for the prevention of root resorption after dental trauma**
    - **Inflammatory and replacement resorption**
      (Sae-Lim, Wang, Trope *EDT* 1998; 14: 216-20)

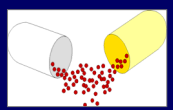


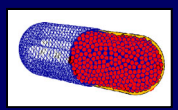


Inflammatory & Replacement Resorption

Antibiotic Use for Dental Pain

- Antibiotics will ***NOT:***
  - Help resolve pulpitis
  - Prevent post-operative pain
  - Prevent "flare-ups"
  - Help "just in case"
    - *Especially on Fridays !!*





Antibiotic Use for Dental Pain

- Manage dental pain by:
  - Removing bacteria in the tooth
  - Removing the pathways of penetration
    - → Decay, cracks, restorations breaking down
  - Treating the root canals (if necessary)
  - Restoring the tooth

Thank You

- *"Thank U"*
  - By Alanis Morissette
    - → 1997

"How 'bout getting off of these antibiotics..."