Management of Pain Emergencies

We will see many patients coming with emergency cases such as pain or trauma, they need treatment.

It has been estimated that 90% of patients coming seeking emergency treatment for orofacial pain have symptoms of pulpal and/or periapical disease, it is the most common cause of toothache or sometimes headache. Other emergencies include abscesses, fascial space infections, and cracked teeth.

Endodontic emergency treatment usually takes place between regular patients. I.e. these patients are not scheduled so you need to fit them in between your patients, so you need to be very efficient in terms of diagnosing the problem and relieving their symptoms. Diagnostic and therapeutic procedures must be as simple as possible but with the objective of treating the correct tooth and of relieving the patient's pain (we don’t have the luxury to see this patient for one hour so usually you need to relieve their problem within 10-15 minutes maximum which is why it is called "emergency treatment").

Emergency treatment should be the first phase of the regular final treatment. Therefore, whatever you do during this emergency visit shouldn’t jeopardize your final treatment; it should be part of it.

* Sequence of steps to go through;
1. *Establish a definitive diagnosis* – this is the most important step, the patient came in with pain we need to know what this pain is. We do history and examinationuntil we reach a diagnosis, we can't start our treatment without reaching a diagnosis.
2. *Achieve profound anesthesia* -if we diagnosed a dental problem and we want to interfere⮊anesthesia! Painful dentistry is not accepted. The patient should not feel any pain (we had a whole lecture concerning anesthesia).
3. *Perform the emergency procedure* - we will talk about them, we have many misconceptions here in Jordan and dentistry
4. *Prescribe analgesics* – most of the times
5. *Prescribe antibiotics* – sometimes
6. *Arrange for definitive appointment*

🕭*This applies to every single emergency treatment*🕭

1. Establish a definitive diagnosis:can be challenging but if we follow a systematic approach, it will be possible!

We should listen to the patient and rush into taking radiographs, the most important part is **the history.**

1. Achieve profound anesthesia:Pain is not only physical, it has an emotional component and therefore you should approach your patient with sympathy. Patients who are in pain and don’t sleep at night are very apprehensive!

We have to know the difference between hyperalgesia and allodynia.

* Hyperalgesia: an exaggerated response to a noxious stimulus. (Something that is normally mildly pain painful will be very painful)
* Allodynia: an exaggerated response to a non-noxious stimulus. (Pain upon touching)

Achieving anesthesia can be very difficult such as in irreversible pulpitis and we have already talked about the role of inflammation in retarding the effect of anesthesia.

When there is an abscess, no one will give anesthesia inside it, so we can go around it, give an injection mesially, distally, and probably palatally. (Ring anesthesia)

We may have to work without anesthesia if the patient cannot provide adequate access by opening his mouth widely.

1. Perform the emergency procedure: Always give the patient options, for example if the patient has irreversible pulpitis and is not bothered, the best option here may be to extract the tooth and not to perform a RCT.

*1- Pulpal inflammation*:very common

1. Reversible pulpitis:not really an emergency since pain has to be stimulated.
* Transient pain of mild to moderate severity
* Stimulated pain (not spontaneous); thermal and osmotic sensitivity which subsides immediately after removal of stimulus.
* Treatment: Usually due to caries or a defective restoration.

Removal of the caries (or cause of the stimulation); sealing of exposed dentine

Bacteria-tight coronal restoration: either permanent or temporary

A base/ liner might be needed.

1. Irreversible pulpitis:(symptomatic)
* Severe dull ache, which lingers upon examination
* Spontaneous - but can be made worse by thermal stimulation (especially hot)
* Poorly localized most of the time, as long as the inflammation had not spread to the PDL (patient may not be able to differentiate if it is upper or lower, the only thing they know is if it is right or left).
* Usually wakes up the patient (This is very important since it differentiates pain that is due to tissue damage from pain that is psychological since this does not wake up the patient).
* Prolonged pain even after removal of the stimulus
* May be associated with acute apical periodontitis.(Tender to percussion)

Diagnosis: Can be easy if the patient’s teeth are all in good condition except for one tooth which is carious, however if all the teeth are in a bad condition, diagnosis will be much harder. Moreover if all the teeth are in a good condition and you cannot detect caries even radiographically (especially if the Xray equipment are not calibrated), this will make diagnosis more challenging. Another challenge would be a heavily restored dentition with multiple deep restorations.

**The most important step is to reproduce the patient's symptoms** (palpation, percussion, thermal tests) or relieve the patient's pain (selective anesthesia, cold test)

The xrays may be misleading and show you that the wrong tooth is the cause of pain and therefore reproducing the patient’s symptoms is very important.

Emergency management: In the hospital’s emergency room, they simple open an access cavity which is wrong since we need to remove the coronal pulp at least to resolve the symptoms. What happens is that they usually suffer while giving the anesthesia and they can hardly drill a correct access cavity since the patient keeps complaining, so all they do is expose the pulp, making the symptoms worse. (They lacerate the pulp, adding insult to the injured pulp)

Some would argue that we need to remove the entire pulp, others say remove the pulp from the largest canal (distal in the lower, palatal in the upper), or if you have time, remove the entire pulp. (Single visit treatment)

Even though the pulp is inflamed, up to this moment, it was sterile! so don’t ever work without a rubber dam. Some people leave the access cavity without a temporary filling which is wrong.

Suppose we don’t have enough time to finish the entire treatment in one appointment, do we need an inter-appointment medication?

Dressing; definition: is inter-appointment medication!

1- **Ledermix: Antibiotic + Corticosteroid**

It is a combination of Demeclocycline hydrochloride (tetracycline) and Triamcinolone acetonide (corticosteroid). We do not have it at JUH but it is very popular worldwide. Some people think it is magic. Sometimes you get acute osteitis after RCT so if you just put Ledermix. Some people use it on a routine basis however this is not necessary.

2**- Non-setting calcium** is an antibacterial dressing (Some people argue that it is impossible to remove it 100% and that it may compromise your seal).

3- Formocresol(Unfortunately we still use it at our clinics. What it does is tissue fixation; however, this is not our objective, we want to get rid of the tissues, not fix them. It has so many disadvantages: it is toxic to the liver, mutagenic and carcinogenic).

4- None if you have a good coronal seal.

c. Irreversible pulpitis: (asymptomatic)

A tooth that has no symptoms, but has deep caries or tooth structure loss that if left untreated, will cause the tooth to become symptomatic or non-vital.

**This is NEVER an emergency situation.**

A patient present with such a tooth will respond normally to vitality tests, and therefore we should not treat it by removing the pulp! We should try vital pulp therapy. The Dr showed us a case where they treated such a patient with pulp capping, which is contradictory with the diagnosis’ name since the term irreversible implies that the pulp must be removed!

\*\* Fluid-tight **coronal seal:** (MOST IMPORTANT)

If you don’t have a coronal seal, then you are doing more harm than good!

The worst thing we can do to our patient is to open an access cavity and leave it open after a case of irreversible pulpitis (where the pulp was vital and sterile); this is a crime!

The patient will return the next week with an infected pulp which will change our treatment plan! We will have to treat an infected tooth rather than a tooth with an inflamed pulp.

During placing a temporary filling, keep in mind that;

There needs to be a good thickness of it; a layer at least 3-4 mm

It must be well adapted

Maximum 1-2 weeks (do not rely on it for so long)

Different materials can be used; such as:

ZnO-eugenol-based materials: Cavit, IRM, SuperEBA

Glass ionomer cements

Composite?? If we use composite without bond; it doesn’t really seal; so it gives you a nice appearance but there is no function in it. GI and ZnE seal better!

Occlusal reduction:

Patient has pain on chewing/touching. (Acute apical periodontitis)

If the tooth is scheduled to receive cusp-protecting restoration (crown) then occlusal reduction during emergency management is indicated, but not always.

What happens is that when we remove the pulp, the symptoms will disappear however the acute apical periodontitis will take time to settle thus occlusal reduction will be advantageous.Always be conservative!

d. Necrotic pulp: The patient will have some sort of acute apical abscess. They will present with pain that is due to the abscess and not the tooth itself and you should be able to distinguish that from the history since the management is completely different!

The pain is very severe and very well localized unlike irreversible pulpitis. The tooth will be very tender to touch and the patient may say that the tooth feels elevated in the socket. (Pus will push the tooth out of the socket)

Very often there will be swelling (intraoral / extraoral).

We reach diagnosis from the presentation and then we do our normal examination, palpation and percussion are very important tests in this case.

The tooth may sometimes be mobile.

Pulp is of course not vital. We may sometimes find some sort of radiolucency but a lot of times there are no radiographic findings. (Radiographs are not very diagnostic)

Our objectives: Achieve drainage if there is some sort of swelling, and to rid the body of the source of irritation which is the infected tooth.

We either extract the tooth if the swelling is localized and we can achieve proper anesthesia and there is no risk of spreading the infection, or do a proper disinfection of the canals, drilling an access cavity alone is useless.

We might see pus draining through the canal after opening an access, sometimes we have to encourage drainage through the canal by over instrumentation. (The down side is that we are pushing the infection out of the canal into the periapical area)

Sometimes we have to go for a surgical incision; **we only do it if there is a fluctuant localized swelling!**If it is firm and diffuse, we shouldn’t drain it because all we will get is blood and there is a serious risk of spreading the infection further.

If it is fluctuant, we stab it with a number 11 blade all the way down to the periosteum then we insert a hemostat and expand that area. Sometimes we may need a drain. If the swelling is localized and fluctuant and you think you drained it all then there is no need for a drain. However when we talk about a swelling in the fascial spaces, we may need to use a drain.

The idea behind the Incision & Drainage is that it allows decompression of the tissue spaces and prevents further spreading of the infection. Pus will need to come out, if it doesn’t, it will look for the path of least resistance and will spread to adjacent spaces.

Incision and drainage will provide the patient with immediate relief!

*Leaving the tooth open / open drainage:* There are no indications for this, not irreversible pulpitis, nor apical periodontitis.

This is a very common practice by so many dentists.

An absolute contraindication for leaving a tooth open is a tooth with a(n);

-Inflamed vital pulp.

- Symptomatic apical periodontitis without swelling be left open for drainage.

A 5-year retrospective study comprising 2188 patients with necrotic teeth - only 11 teeth were left open because of persistent exudation; so it is extremely rare.

**If we do end up doing it, we must recall the patient within 24 hours**. (We may use this if we have uncontrolled exudation, however the Dr said he never uses it)

Some dentists do this and either place a cotton pellet or nothing at all, the patient will return with all sorts of food debris inside the canal, the tooth might as well be extracted.

Note: If a patient has uncontrolled exudation, we leave the rubber dam on for half an hour then add some dressing.

⮊ Leaving the tooth open might be considered only in very rare cases when exudation is so severe that it is virtually impossible to close the tooth, and it should be a good clinical practice to re-appoint the patient with 24 hours.

Now after we achieved drainage, we need to remove the source of irritation which is the infection so we go for canal instrumentation and irrigation as we normally do, the only difference is that we have to prepare the canal to a larger size. (If we are working on two centrals, one has vital pulp while the other has an apical abscess, we prepare the one with the abscess to a larger size since I need to scrape of more infected dentine)

As we said, we may need to over prepare the canal in order to encourage drainage. Instead of immediately using a size 10 file and pushing the infection out of the apex, we could clean the coronal part (sufficient coronal disinfection by coronal flaring and disinfection) and then try to encourage drainage.

Do we need intra-pulpal medication? Yes in this case we do need it, Non-setting Calcium Hydroxide is the intra-pulpal medication of choice in this case.

*Trephination:*Only surgeons do this, if there is some sort of acute apical abscess, they raise a flap, drill the bone, and then encourage drainage. There are no indications for it what so ever! There is a seriousness of spreading the infection.

If the abscess manages to escape to the fascial spaces, then we are talking about a diffuse swelling that is not very painful, but has different manifestations of an extraoral swelling. So whether the pus will stay intraoral or somewhere else depends on two things:

**1- The proximity of the root apex to the buccal or palatal cortical plate**

**2- The level of the apex in relation to the muscle attachment**

If the root is longer than the position of attachment of the buccinators muscle, then we will have some sort of extraoral swelling. While if it is shorter it will stay within the mouth.

You need to know the fascial spaces, but not in details.

-We divide them into :

Mental, Submental ,Sublingual ,Submandibular, Buccal, Submasseteric, Pharyngocervical spaces and the Midface. Midface cases can be life threatening.

(doctor reviews pictures showing how the muscular attachment level affects the extension of the swelling – either above the attachment level or below-keep in mind the Mentalis,Mylohyoid and Buccinator muscles).

-Submandibular space infections can be very serious.

**Ludwig’s Angina can obstruct the airway!** > management: drainage, Iv abx, they need to be HOSPITALIZED.

**Cavernous Sinus Thrombosis** any infection that goes to the canine space or the midfacial spaces ,since the veins are valveless can spread easily to the cavernous sinus, to contain the infection , the body’s immune system creates a clot to prevent the spread of bacteria and other pathogens. The clot increases the pressure inside the brain. This pressure can damage the brain and ultimately cause death. Thrombus formation leads to embolism which could be life threatening.

-**Cracked Teeth** they are easy in concept but difficult to diagnose. Patient comes with pain and they describe vague symptoms they don’t really know whats appening, the don’t tell you something that reproduce their symptoms but they tell you pain comes with chewing, however the fact that its poorly localized gives you the hint that there is some sort of pulpal involvement. Pain is sharp and quick, occurs upon chewing, if its at an early stage the pulp is still healthy so thermal stimulation will not get you anywhere, you have to ask about history and look for cracks if you suspect any ( using transillumination or magnification) and usually it comes with patients with heavily restored dentition esp around amalgam restorations. Pulp tests here are not very diagnostic here but you need to at least confirm that the pulp is vital; if the pulp is necrotic there would be no symptoms at this stage. Radiographic examinations will not tell you anything since it’s just a crack but the most diagnostic test is the *Bite Test ( you ask the patient to bite on something really hard and then let go all of a sudden, what happens when they are biting really hard the crack opens up a little bit as soon as they let go all the irritants saliva and whatever will go inside and press on the nerve fibers and this induces the sharp pain that’s poorly localized.*

Management of a cracked tooth when the pulp is healthy should be subjected towards preventing further propagation of the crack, sometimes composite would do but sometimes cuspal coverage is required. If the pulp is irreversibly inflamed or necrotic then RCT is required. If the crack if so severe that it’s a fracture now then the tooth needs **to come out**.

Now, ***Post Operative Pain:*** very common, you do a RCT and patient comes back with pain, now you have to decide if its one of the following causes we are going to discuss or you failed to do the appropriate RCT.

1. First thing is *Over Instrumentation.*
2. *Overfilling*. \*pay attention to sealer or materials getting inside critical spaces such as the ID canal\*
3. *Extrusion of the irrigants; Hypochlorite accidents.*
4. *Overheating* when cutting GP. (might cause pain or necrosis)
5. *If you place your TF and did not check for occlusion.*
6. *And of course always keep in mind non-odontogenic facial pain.* (Jaw problems,sinus,salivary glands,neuralgias and Migrain [ we know that the dura matter is supplied by the maxillary and the mandibular branches of the Trigeminal nerve so he could come with symptoms of toothache].
7. *Psychogenic pain* always an option.

So, if you suspect non-odontogenic facial pain prescribe simple analgesics don’t go farther and refer the patient to someone who can diagnose him and NEVER do unnecessary treatments.

\*Keep in mind those patients with Periodontitis or Gingivitis DO NOT come complaining of symptoms.

The only **causes** of ACUTE periodontal pain are those :

1. **Gingivostomatitis**.
2. **NUP**
3. **Pericoronitis** ( you either take the tooth out or operculectomy)
4. **Acute periodontal abscess** usually associated with a deep pocket and most of the time the pulp is spared.

Analgesics

1-opioids they act centrally, in addition to eliminating pain they suppress cough and reduce GI mobility (constipation is one major side effect).

2- non-opioids (Paracetamol [acetammenophen] or NSAIDS).

Paracetamols are the safest analgesics we have BUT with acute high doses up to 10 g at a single dose they are very toxic. Unknown MOA.

NSAIDS work on Cyclooxigenase enzymes which are responsible for the prostaglandin synthesis which are associated with pain so if you block their synthesis you’re actually stopping pain. Problem is : we have two types of cyclooxigenases COX1 and COX2. COX1 which produces prostaglandins that have other functions such as on GI lining, kidney function and Platelets.COX2 produces prostaglandin that are related to pain. Thus when you block the action of both you’re actually affecting other organs leading to gastric ulcers, peptic ulcers and bleeding problems.

*Non-Selective COX inhibitors* like *Ibuprofen,Diclofenac* *and Naproxen.*

**Selective COX inhibitors** were thought to have a very promising outcome however there is good evidence that they are associated with increased cardiovascular accidents due to their effect on prostacyclins.

**Celebrex is one example of the selective COX Inhibitors**

 **\*Doctor recommends referring to the “Oxford League Table of Analgesic Efficacy”**

-IF the NSAIDs are not enough for controlling pain of the patient, he is asked to alternate with Paracetamol.

**-ANTIBIOTICS**

Empirical Prescription is applied in these cases.

Most common antibiotics:

-Amoxicillin with calvulanic acid is probably the most effective with a wide spectrum.

-Metronidazole by itself doesn’t do anything so it’s okay to give it on top of the amoxicillin,it covers a wider spectrum.

\* Always remember **contraindications.** *\* Metronidazole is contraindicated with Alcohol.*

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