**Cystic lesions in the jaw**   
In the previous lecture we talked about *surgical management of the cystic lesions* by :  
1- enucleation  
2- marsupialization .  
3- enucleation and curettage .  
4- marsupialization followed by enucleation .   
  
today we will talk about *classification of cystic lesion*   
the classification itself is not important - since it will be updated regularly , we only aim to have a list of differential diagnosis depending on history , signs and symptoms and radiographic features . the definitive diagnosis only reachable after a histopathological examination for a biopsy .   
  
so you have to know the general features of cystic lesions and the feature of the most common cystic lesions ONLY

*The most common cystic lesions in the oral cavity*   
1- *Radicular cyst*   
70% of all cystic lesions and it is the most common one .   
2- Dentigerous cyst   
the 2d most common cyst in the oral cavity .   
3- Keratocyst   
the 3d most common cyst in the oral cavity.   
4- nasopalatine   
the 4th most common cyst in the oral cavity.   
   
all of them account for 90-95% of all cystic lesions in the jaw , so you have to know their features by heart .   
  
***odontogenic inflammatory cyst***

**1-** **Radicular cyst :**   
*type* :  
 odontogenic cyst .  
 *origin* :  
 inflammatory in origin , the source of inflammation is a non vital tooth . so to diagnose a cystic lesion as a Radicular cyst it's a must to have a non-vital tooth , it Develops from the epithelial remnants of Hertwigs sheath- the cell rests of Malassez when it is inflamed .  
 *frequency* :   
the most common cyst in the jaw ( because inflammation is common in the teeth)   
*age* :   
usually it is common in adults 20-50 years  
*site* :  
 apex of a non-vital tooth, if the tooth is an endo-treated tooth then definitely it is non-vital , but if it is not treated endodontically we have to do vitality test and if the tooth is vital then Radicular cyst is excluded .   
  
*size*  :  
 1.5 – 3 cm in diameter ( the size increase with time if it is left un -treated )  
*radiographic features* :  
round , well defined corticated – with clear border – unilocular uniformed radiolucency ( only one radiolucent lesion) but once it's infected the radiolucency become hazy -not black all over .   
\* the source of infection from oral cavity due to poor oral hygiene or due to suppression of the immune system from a systemic disease so the bacteria gain access to the cyst and cause infection .   
*effect on the surrounding*   
Radicular cyst is a benign lesion as most of the cystic lesion ( only some cystic lesion behave as aggressive ) since it's benign it may :   
1-displace the teeth ( push the roots of the teeth without resorbing them ) , it is not easy for any lesion to cause resorption of the cementum unless the lesion is very aggressive .   
2-it might cause bone expansion as it grows inside the bone without perforation of lingual or buccal cortex because it is not aggressive enough to do so , this expansion increase with time if the lesion left untreated .  
3-it can also cause displacement of the sinus wall .  
  
\*\*\* SO if we have a uni-locular radiolucent lesion around the apex of non vital tooth that cause expansion then Radicular cyst will be on the top of differential diagnosis because it accounts 70% of all cystic lesions and your differential diagnosis has to be listed from most common lesion to the least common one .   
 *management of Radicular cyst*   
we have to manage   
- the cyst itself .  
- the causing factor ( non-vital tooth ) .  
  
***management of the non-vital tooth***   
- if the *tooth is restorable* then we go for root canal treatment  
- if the *tooth is restorable but the root is involved in the lesion* then we go for root canal treatment and apicoectomy.   
- if the *tooth is non- restorable* or the *surrounding bone is severely resorbed* or the *tooth is very mobile* then we go for extraction .  
\* always keep in mind that root canal treatment will treat the peri-apical lesions as long as it is a granuloma but once it converted to a cystic lesion we have to treat the cystic lesion it-self   
***management of the cyst***by enucleation we remove the lesion without touching the bony borders , once it's enucleated and the cause is treated successfully the recurrence rate is very very low .   
  
\*\* although most of Radicular cyst are of moderate size ( unlike the Dentigerous cyst ) , someone argue that if the cyst left untreated for long time it will be very large in size, so we might think of marsupialization as treatment - remove part of the lesion and allow it to shrink , after shrinkage we enculeate the lesion .   
  
***2- residual cyst***   
all what we said about Radicular cyst is applicable to the residual one with the only difference that the inflamed tooth has been extracted without treatment of associated cystic lesion .  
it is difficult to diagnose .. due to absence of inflammation source so we reach our diagnosis from the histopathology which has the same microscopic features as Radicular cyst .   
*management* : same as Radicular cyst .

***3- Lateral Radicular cyst***   
same as Radicular cyst but it only differ in the site , it is between 2 adjacent teeth one of them has to be non-vital -it is not around the apex ( like Radicular cyst ) .   
if both teeth are vital then the lesion is lateral periodontal cyst rather than a lateral Radicular cyst .   
*management :*  treat the non vital tooth and enculeate the cyst .  
  
 ***odontogenic developmental cysts***   
   
  
***1- Dentigerous cyst***   
 *frequency* :  
 the second most common cystic lesion after Radicular cyst it accounts 20% of all cystic lesion . *location* :   
associated with the crown of impacted tooth , since the most impacted teeth are lower 3d molar followed by upper canine then lower fives , the most common site of dentigerous cyst are posterior mandible around the lower 8 and canine area in the maxilla   
*age* :   
it is usually most common in 20-40 years of age because at this age the teeth already impacted and start to develop a pathological lesion .   
*size* :   
variable in size it starts small but if it left untreated it can reach a very large size and it is common to find a large Dentigerous cyst since it is a symptomatic and associated with impacted tooth , unlike the Radicular cyst which is associated with inflamed tooth so it is usually presented with some signs and symptoms .however , the Radicular cyst can also be asymptomatic if it is associated with a non vital tooth without acute infection , but it is more common to have a asymptomatic Dentigerous cyst .   
so it is diagnosed accidently when we take an OPG to treat another tooth , or if the pt feels the expansion as swelling, or if the pt complain of pain once the cyst is infected *.*

*radiographic features* :   
uni- locular , well defined corticated , uniformly radiolucent unless it is infected ,   
 *effect on surrounding structure*s  
- it can cause bucco-lingual expansion ( swelling )   
- it can displace the impacted tooth and the surrounding teeth but very rarely to cause resorption   
- it might displace the wall of the sinus which is a favorable place to any maxillary lesion due to low resistance .   
  
according to cyst- crown relation the Dentigerous cyst might be   
- central (lesion around the crown )   
- lateral ( lesion lateral to the crown )   
- circumferential ( the tooth inside the lesion )  
  
\*\*\* notes  
-if any lesion cause paresthesia it is an alarming sign for malignancy or benign aggressive lesion .   
- the benign cystic lesion might cause pushing for the nerve inside it's canal without causing resorption of the canal walls , so paresthesia is very rare in any cystic lesion unless it get infected and result in osteomyelitis .   
 *Treatment of Dentigerous cyst* ;   
We have to take into consideration 2 things ; impacted tooth and cystic lesion . we have different treatment modality according to the case   
1- **enucleation** of cystic lesion and tooth as one piece.   
if the impacted tooth is not strategic tooth as lower 3rd molar then we can remove the cyst with the impacted tooth as a one piece , so the treatment is enucleation of both cyst with the tooth .  
2 **marsupialization** - if the Dentigerous cyst is very big and the lower border of the mandible is very minimal so if we enucleate the cyst as one piece we will weaken the mandible and increase susceptibility to fracture .  
- if the cyst is very large and the access to it is very difficult and hard to removed as one piece .

So here we have to think of other treatment modalities , as marsupialization ,in which we remove the cover of the lesion and suture it’s lining with the surrounding normal mucosa so we evacuate it’s content and it’s fluid and this will decrease the pressure inside the cyst which will gradually decrease in size so we will be able to enucleate it easily without any risk of mandibular fracture .

\*\*\*So what we always aim for is enucleation of the whole lesion, but if this impossible due to the size of the lesion , having risk of damage vital structures as inferior alveolar nerve or having a risk of mandibular fracture then we go for marsupialization to decrease the size of the lesion then do enucleation .   
  
In previous lecture we took different treatment modalities for treating any kind of cysts , but you have to think of the option that suitable to the case , when to use enucleation , enucleation with curettage or marsupialization ???

For example in case of having impacted canine , with enough space for it in the arch , by doing enucleation you will lose the canine with the enucleated cyst . so in this case you can do marsupialization , open a part of the lesion , allow the lesion to shrink gradually and the bone will form, this allow the tooth to erupt either by it’s own or by the help of orthodontic treatment , but suppose that the patient is not welling to have orthodontic treatment and he is happy with his occlusion or even there is no enough space for canine to erupt then we will go for enucleation of the cyst with the impacted canine.   
So not all cases of impacted canine is treated by marsupialization .

**So always remember that our treatment modality must be determined according to the case .and enucleation alone is not always enough , suppose during enucleation of Radicular cyst or Dentigerous cyst a fragmentation occur then you have to do curettage for the whole walls to be sure that there is no remnants left .**

* Q: Can we do marsupialization without **enucleation** ?
* Yes we can , if we do marsupialization and wait for long time shrinkage will occur followed by bone formation and eventually the lesion will heal by it's own and this is what we do in case of impacted canine .

**2- eruption cyst :follicular cyst during eruption .**

* Type : Dentigerous cyst in the soft tissue .
* Age : It is very common especially in children in mixed dentition stage during tooth eruption , Due to trauma to the soft tissue which will induce inflammation and fluid accumulation and bluish hematoma may occur .
* Management : If it is painful we may give topical anesthesia , If it inhibit tooth eruption , then we give local anesthesia to make a small incision on the soft tissue and wait for eruption after a period of time .

**3- Odontogenic Keratocyst ;**

This cyst has a great debate either to call it a cyst or a tumor, this debate arise from it's behavior which is a cyst with high recurrence rate , because the cells are on the wall so it is not enough to do enucleation. Nowadays it is considered as a cystic lesion .

* *Age*:   
  in the 2nd and 4th decade
* *Frequency*  :   
  it forms less than 5% of all odontogenic cysts in oral cavity

\*\* The associated teeth are vital

* *Site*:   
  Posterior body of the mandible is the most common site ,, Anterior maxilla in canine region
* *Radiographic features*  
   It is usually multi-locular , but in some cases may be present as uni-locular, Radiodensity: Uniformly radiolucent
* *Effects on surrounding* :   
   \* rarely to cause resorption of the adjacent teeth , it may cause displacement   
   \* although It doesn’t cause expansion in buccolingual direction it grows in ant.post. direction inside the cancellous bone .   
     
    
  *management* , there are different types of management :

1. enucleation alone , but this associated with high recurrence rate
2. enucleation and curettage with application of Carnoy's Solution  
   Carnoy's Solution which is a mixture of chemicals one of these chemical is formaldehyde , there is a great debate about it's use due to it's irritation and traumatic effect on the soft tissue , and it's carcinogenic effect due to formaldehyde   
   however , new generation of Carnoy's Solution without formaldehyde is available .
3. excision remove the lesion with the surrounding bone which result in cure of the lesion without recurrence

Q - why we don’t do excision for all types of Keratocyst ?  
 as we said before ; we chose the treatment modality according to the case . e.g if we have large Keratocyst you may need to remove the whole mandible in order to excise the Keratocyst . **so if it is possible** to excise the Keratocyst with a safety margin ( 3-4 mm of the surrounding bone ) then go for excision which is the best treatment modality , **If it is not possible** ,when the lesion is very large and very close to vital structures you may think of marsupialization and after it shrinks you may do excision .

1. You cant say it is wrong to do enucleation with very good curettage but you need to follow it up as recurrence rate is very high .

Multiple keratocysts associated with **Gorlin Syndrome (nevoid basal cell carcinoma syndrome) which has the following** features :

* Multiple Odontogenic Keratocysts , in upper and lower jaws .
* Multiple Basal Cell Carcinomas , in the skin
* Skeletal Anomalies, e.g. bifid ribs (rib with 2 heads ) and calcification of the flax cerebri (separation between 2 lobes of the brain )
* Management is very difficult you have to treat the multiple keratocysts as you are treating each one individually .

The following developmental cysts account less than 5% of oral cystic lesions :

**4-Developmental Lateral Periodontal Cyst**

* Age: Variable
* Frequency: Uncommon
* Similar to lateral Radicular cyst , but here teeth are vital .

**5- Glandular Odontogenic Cyst :**

* Site: common in anterior area of the mandible (other cysts common in the post area of the mandible )
* It crosses the midline
* multilocular
* It may cause Paresthesia as it is close to the mental nerve and it is very aggreassive
* After enucleation it may re-occur
* It is very rare

**Non-Odontogenic Cysts**

* **Developmental Cysts**
* Nasopalatine duct cyst
* Nasolabial cyst
* Median Palatine Cyst
* Globulo-Maxillary Cyst
* Median Mandibular cyst

1. **Median Mandibular cyst** : cyst in symphyseal area ( between the 2 pieces of mandible ) , very rare , all the reported cases don’t exceed 6-7 cases .
2. **Median Palatine Cyst** : it is a remnant of epithelium between the 2 shelves of palate , very rare with very small number of reported cases .
3. **Globulo-Maxillary Cyst** : description of the lesion in the maxilla between upper canine and lateral , but upon biopsy it can be any other type of cystic lesion . so it is only clinical term describe the site of the cyst .
4. **Nasolabial cyst** : (it is not a bony cyst )rare cyst occur in the soft tissue at the lateral border of the nose appear as swelling with no radiographic features .

5- **Nasopalatine duct cyst** :  
expansion or cystic lesion in the content of the duct .  
Occur at age between 40-60 .  
It is only 1% of all cystic lesions

* How to Differentiate between Nasopalatine Duct **Cyst** and a large **normal Naopalatine foramen**?
* You have to know the feature of the cyst :
* Size: Variable, but usually from 6mm to several cms in diameter.
* Shape: Round uni locular and Well corticated
* It’s affect on the Adjacent teeth is distal displacement, rarely resorbed

|  |  |  |
| --- | --- | --- |
|  | Cyst | Normal NP duct |
| Boundary | Well corticated |  |
| Size | More than 6 mm | Less than 6 mm |
| Shape | Heart shape \* |  |
| Radiolucency | Uniform | Not uniform ; as it has vessels |
| outline | Clear outline |  |

* Management of the cyst ; enucleation, open it then clean it up and remove the cyst as one piece .

**Radiographic features of nasopalatine cyst :**

* They are seen as a solitary well-defined, oval or round unilocular radiolucency, between central incisors, > 0.6 cm in diameter. They may appear “heart-shaped” if the anterior nasal spine superimposed. Root resorption and tooth displacement may be present

\* http://radiopaedia.org/articles/incisive-canal-cyst

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