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內文：

※ **Aim**

Pneumatocysts are benign, gas-containing lesions, most commonly observed affecting the vertebrae, sacrum, and ileum. These lesions are asymptomatic and are detected incidentally during CBCT examinations. Recognition of the pathognomonic features of this benign, innocuous lesion is important to avoid unnecessary investigations and causing alarm to the patient.

※ **Introduction**

Intraosseous gas collection is considered an uncommon finding affecting the vertebral bodies. It has been associated with various pathologic conditions that include gas-forming osteomyelitis, osteonecrosis, trauma, and surgery. However, an innocuous and relatively more common cause of intraosseous gas collection in the vertebral bodies is the intraosseous pneumatocyst.

Four cases of intravertebral pneumatocysts, selected from UCLA radiology archive. All four cases were detected as incidental findings on CBCT scans.

※ **Case report 1**

# **General Data**

- Name : Unknown
- Gender : male
- Age : 59 y/o
- Native : Unknown
- Marital status : Unknown
- Chief Complain :  
Evaluate the posterior left mandible for implant placement.
- History : Unknown
- Personal History : Unknown
- Family History : Unknown
- Oral examination : Unknown
- CBCT



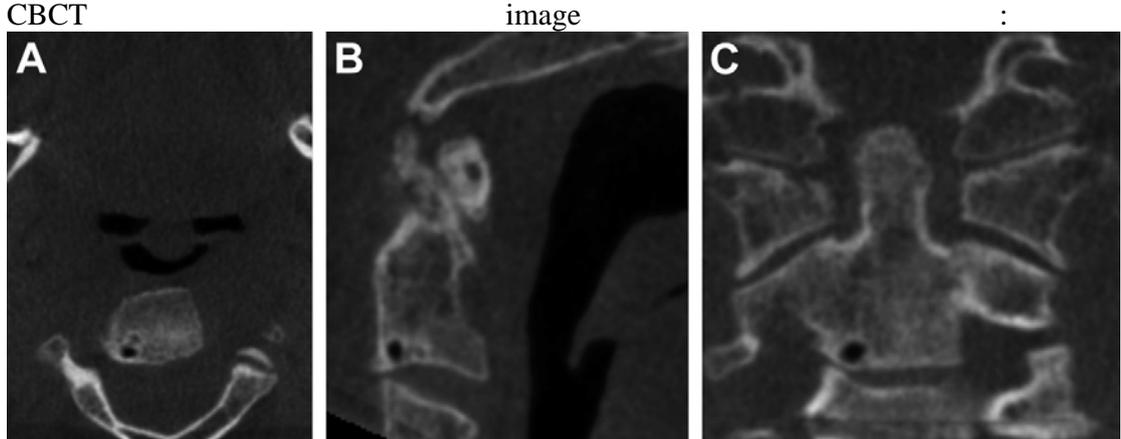
CBCT sections illustrating a well defined corticated radiolucency in the C3 vertebral body, with the attenuation characteristics of air.

※ **Case report 2**

# **General Data**

- Name : Unknown
- Gender : female

- Age : 67 y/o
- Native : Unknown
- Marital status : Unknown
- Chief Complain :  
Asking for evaluating for potential implant placement
- History : Unknown
- Personal History : Unknown
- Family History : Unknown
- Oral examination : Unknown
- CBCT

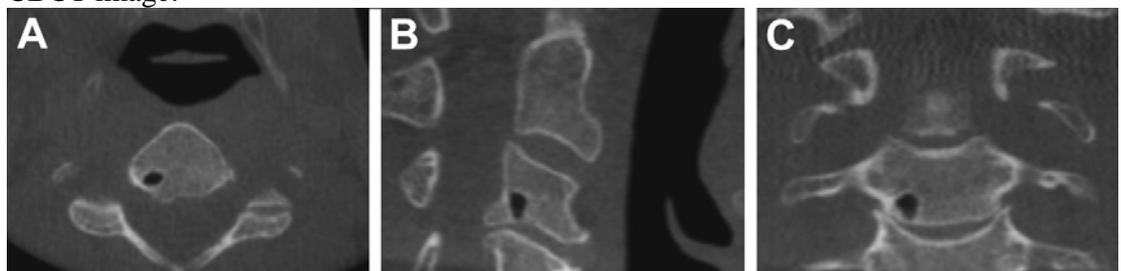


CBCT sections demonstrating a well defined radiolucency, with the attenuation of air, at the inferior margin of the C2 vertebral body, Note degenerative changes in both C1 and C2.

※ **Case report 3**

# **General Data**

- Name: Unknown
- Gender: female
- Age: 60 y/o
- Native: Unknown
- Marital status: Unknown
- Chief Complaint:  
Asking for evaluating for left-sided TMJ pain
- History:  
Left-sided mandibular hypoplasia and osteoarthritis of the left TMJ
- Personal History: Unknown
- Family History: Unknown
- Oral examination: Unknown
- CBCT image:



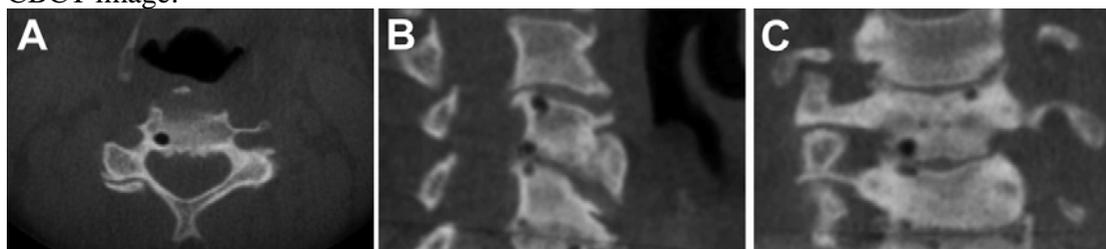
CBCT sections demonstrating a radiolucency at the inferior margin of the C3 vertebral body, Note thinning of the inferior margin of the vertebral body.

※ **Case report 4**

# **General Data**

- Name: Unknown
- Gender: Female

- Age: 55 y/o
- Native: Unknown
- Marital status: Unknown
- Chief Complaint:  
Asking for evaluating for potential implant placement.
- History:  
Partial edentulism
- Personal History: Unknown
- Family History: Unknown
- Oral examination: Unknown
- CBCT image:



Axial (A) CBCT section illustrating a well-defined radiolucency at the posterolateral aspect of the C3 vertebral body. Sagittal (B) and coronal (C) CBCT sections demonstrating multiple radiolucencies in the vertebral bodies of C3, C4, and C5.

※ Review of literature

Table 1. Characteristics of the 21 published cases of intraosseous pneumatocysts in the C-spine (the four cases from the current report are listed at the bottom of the table)

Site of IVP	Age	Gender	Size* (mm)	Coexisting degenerative changes in the C-spine*	Communication with joint space*	Internal density on CT (HU)*	Neck pain*	Fluid*
C6 <sup>14</sup>	NR	NR		Y				
C7 <sup>12</sup>	52	M	10		Y	-850		
C5 <sup>22</sup>	62	M		Y		-700		
C5 <sup>2</sup>	63	F		Y	N			
C5 <sup>3</sup>	57	M		Y				Y
C4/C5 <sup>5</sup>	56	M		Y	N	-87 to -422		
C5 <sup>18</sup>	56	F	6	Y	N	-890		
C5-C7 <sup>20</sup>	69	F	7	Y	Y	-890		Y
C7 <sup>10</sup>	58	F		Y	N	-580 to -950		
C6 <sup>10</sup>	89	F		Y		-580 to -950		
C4 <sup>10</sup>	53	F	10	Y		-580 to -950		Y
C5 <sup>10</sup>	46	M		Y		-580 to -950		
C7 <sup>10</sup>	43	M				-580 to -950		
C4 <sup>15</sup>	65	M	12	Y		-890		
C5-C6 <sup>6</sup>	55	M	6	Y		-890		
C6-C7 <sup>17</sup>	48	F	8	Y	N	-900	Y	
C7 <sup>27</sup>	51	F	13	Y			Y	
C5 <sup>21</sup>	56	F	12	Y			Y	N
C5-C6 <sup>25</sup>	59	M	9		N	-559	N	
C4 <sup>4</sup>	51	M	10	Y	N	-970	Y	
C <sup>26</sup>	NR	NR						
Cases from current report								
C3	59	M	3.5	Y	N	NA	NR	N
C2	67	F	3	Y	N	NA	NR	N
C3	60	F	4.5	N	N	NA	NR	N
C4-C6	55	F	5	Y	Y	NA	NR	N

1. Case:  
17 individual case reports from 1988 to 2013 + four cases from current reports
2. Age:  
43 to 89 years, mean age 57.3 years
3. Gender:  
10 males + 9 females + 2 not provided  
Based on currently available information, there does not appear to be an overt gender

- predilection
4. Communication with the intervertebral joint space:  
Only 9 of the 21 reported cases specifically commented which was present in 2 of the 9 cases (22%)
  5. Coexisting degenerative changes in the cervical spine:  
17 of the 21 cases (80%)
  6. Location:  
C5 (48%) C6 (24%)

**Table II. Characteristics of the 500 patients of the Matsukubo et al. study<sup>7</sup>**

Patients with intravertebral pneumatocyst (IVP)	213
No. of patients with C-spine degenerative changes	148
Total no. of IVP	518
No. of IVP communicating with the joint space	275
Location	
C1	0
C2	10
C3	36
C4	73
C5	135
C6	181
C7	83

1. Case:  
The study by Matsukubo et al. examined computed tomography (CT) scans of 500 patients, 213 patients were detected.42% (213/500)
2. Age:  
Mean age 63.4 years  
40s or younger: 8% (7/86)  
Older than 80s : 60% (40/66)
3. Gender:  
Not provided
4. Communication with the intervertebral joint space:  
53% (275/518)
5. Coexisting degenerative changes in the cervical spine:  
69% (148/213)
6. Location:  
C5 (26%) C6 (35%)

#### ※ Discussion

1. Feature:  
Bening gas-containing, small, well-circumscribed, radiolucent lesion delineated by a sclerotic rim; painless
2. Pathogenesis:  
Not fully understand  
One theory is that gas accumulation in the intervertebral disk, known as the vacuum phenomenon, extends into the vertebral body through a defect in a degenerated end plate.  
Other proposed etiologies include spontaneous gas accumulation and secondary gas accumulation in a simple fluid-filled cyst.
3. Location:  
Lower cervical spine  
C5-C6, which are sites more susceptible to degenerative changes due to lordosis  
Outside of the cervical spine, the pneumatocyst is known to occur most frequently in the region of the sacroiliac joint.
4. Prevalence:  
Until recently, the lesion has been described as rare, especially in the cervical spine.

42% (213/500) study by Matsukubo et al.  
The higher prevalence in the more recent reports may also reflect increasing recognition and knowledge of this lesion.

5. Pathognomonic:  
On plain radiographs, the lesion has been mistaken for more invasive lesions, such as metastasis or multiple myeloma. However, the gas-attenuating nature of the lesion on CT and CBCT is pathognomonic. On magnetic resonance imaging (MRI), the presentation is less specific. The lesion demonstrates hypointense signals on both T1- and T2-weighted images, without gadolinium enhancement. Notably, bone lesions, such as enostosis, fibrous dysplasia, and blastic metastasis, also demonstrate similar MRI appearances.
6. Radiographic differential diagnosis: degenerative changes, subchondral cysts, gas-forming osteomyelitis, simple bone cysts, and Schmorl nodes.
  - 1). The air-attenuation characteristics and regular borders are pathognomonic imaging features of the pneumatocyst and are usually sufficient to exclude these other diagnoses.
  - 2). Subchondral cyst: Subchondral cysts are areas of subarticular degeneration and contain granulation tissue. Similar to pneumatocysts, these lesions are typically accompanied by other signs of osteoarthritis, such as osteophytes and cortical erosions. Although radiolucent, these lesions have the attenuation characteristics of soft tissue features, in contrast to the air attenuation features of pneumatocysts, which allows distinction of these two lesions.
  - 3). Schmorl node: The term Schmorl node refers to a degenerative phenomenon in which protrusions of the intervertebral disk occur through the vertebral endplate and into the vertebral body.
7. Natural course:  
Remains unclear- the lesions may enlarge, remain stable, or even resolve into fluid-filled cysts.
8. Treatment:  
Not required, except the lesions become large enough to occupy most of the vertebral Body



※ Conclusion

Familiarity with the demographic and radiographic characteristics of this lesion is of importance to dentists and oral and maxillofacial radiologists to avoid unnecessary investigation of this benign, innocuous lesion and to avoid causing alarm to the patients. Treatment of these lesions is not required. However, given the risk of enlargement of the lesion, follow-up radiographic examination is prudent.

題號	題目
1	Simple bone cysts within the jaws are common between ___ age? (A) 10~20 (B) 20~40 (C) 40~60 (D) 60~80
答案(A)	出處：Oral & Maxillofacial Pathology 5th edition, P632
題號	題目
2	Which treatment is most highly suggestive for simple bone cyst? (A) F/u (B) Surgical curette (C) Endodontic treatment (D) Radiation therapy
答案(B)	出處：Oral & Maxillofacial Pathology 5th edition, P632