Mucous Retention Cysts of the Maxillary Sinus and Superiority of 3D Cone Beam CT Scans versus Traditional Panoramic Imaging

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Mucous retention cysts of the maxillary sinus are thought generally by radiologists and ENTs to be common in the population. They are reported to exist in about 10% of normal and asymptomatic individuals. According to the article, "Mucosal Cysts of the Maxillary Sinus: A Clinical and Radiographic Study", Oral Surgery Oral Medicine Oral Pathology 1980 Sep; 50(3):282-6 authored by Casamassimo PS, and Lilly GE, out of 4546 patients, 73 had cysts in one or both max sinuses, with distribution equal between right and left. One half of these patients with cysts also had periodontal disease and the larger the cyst, the more severe the periodontal disease. Allergies were present also in 50% of patients with mucous retention cysts.

Drainage for the maxillary sinus is half-way up its medial wall, opening into the hiatus semilunaris, which is below the middle concha. Mucous retention cysts of the maxillary sinus can occasionally be large enough to obstruct the natural drainage pathway from the maxillary sinus. Fluids can collect in the floor of the sinus and the sinus will be prone to secondary infection, resulting in the following symptoms:

- pressure and/or pain in the cheek;
- decreased/abnormal sensation in the skin of the cheek;
- pain in the teeth immediately below the cyst;
- and pain/ pressure in the eye above the cyst.

The maxillary sinus is innervated by the maxillary (2nd) branch of the trigeminal nerve (CN V). V2 enters the pterygopalatine fossa behind the maxillary sinus and sends nerve fibers to the maxillary teeth via the anterior, middle, and posterior superior alveolar nerves. These nerves run along the wall of the maxillary sinus, are covered only by epithelium, and supply the epithelium of the sinus, maxillary teeth, and part of the nasal mucosa.

The pterygopalatine ganglion (parasympathetic) is suspended from V2 by two sensory roots. It receives preganglionic neurons from the facial nerve (greater petrosal branch, CN VII) that synapse at this point, becoming postganglionic neurons. They end up in the lacrimal nerve by rejoining V2 through a sensory root, hopping on the zygomatic nerve of V2, up the lateral wall of the orbit onto the lacrimal nerve of V1 and to the lacrimal gland to produce tears.

Trigeminal sensory fibers from all divisions enter the trigeminal ganglion. The lower portion of the spinal tract of V is called the subnucleus caudalis and this is where the afferent "C" fibers synapse. Cranial nerves VII, IX, and X also transmit fibers through the subnucleus caudalis. Electrical connections can occur between adjacent demylelinated axons. These are referred to as *ephapses*. *Epaphtic cross talk* may result in the transfer of nerve impulses from one axon to another. Direct pressure from the cyst itself is enough to cause the symptoms stated above, but this ephaphtic cross talk is possibly capable of producing other symptoms as well, from the structures innervated by CNs VII, IX, and X.

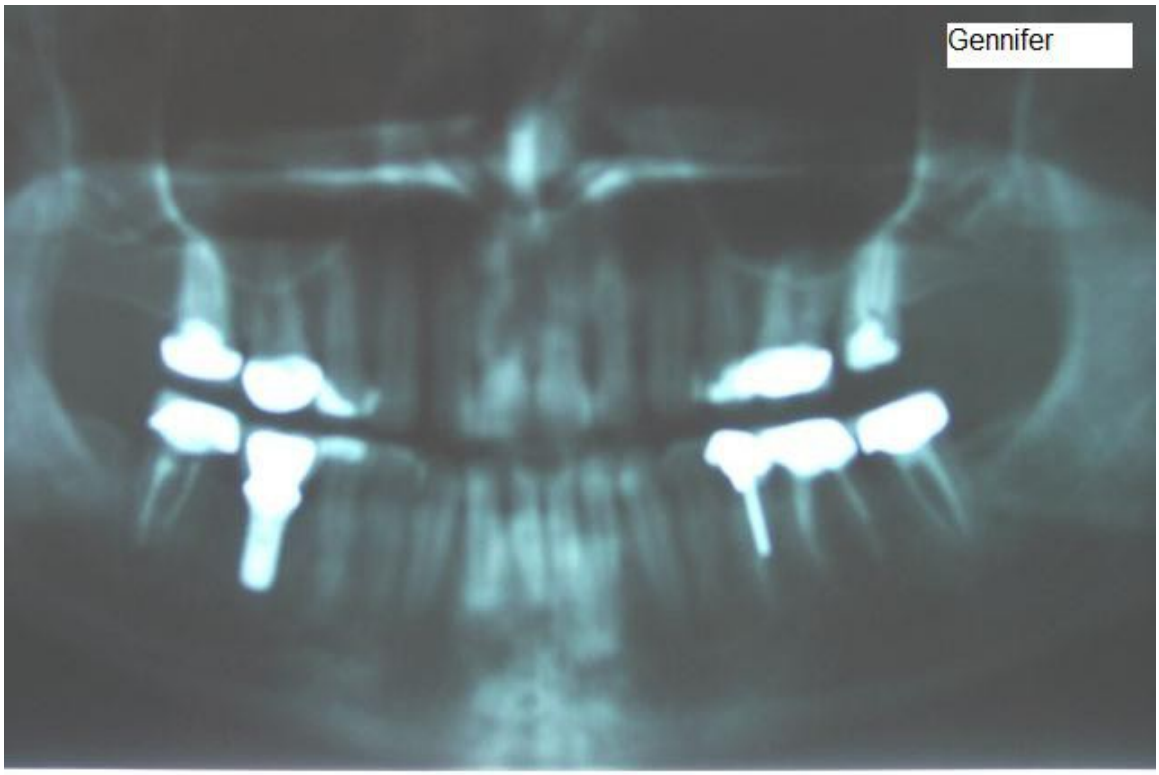
Disorders of the maxillary sinuses may result in symptoms patients interpret to be of dental origin. Mucous retention cysts of the maxillary sinus are becoming more prevalent in the population in general and can exert pressure on the roots of teeth, making them symptomatic via the sensory nerves of the periodontal ligaments, causing tooth pain and sensitivity to chewing. Dentists can be fooled in their differential diagnoses of the tooth pain, often causing patients to experience unnecessary root canal treatment, followed by crowns. If the sinus cyst is the cause of the tooth pain,

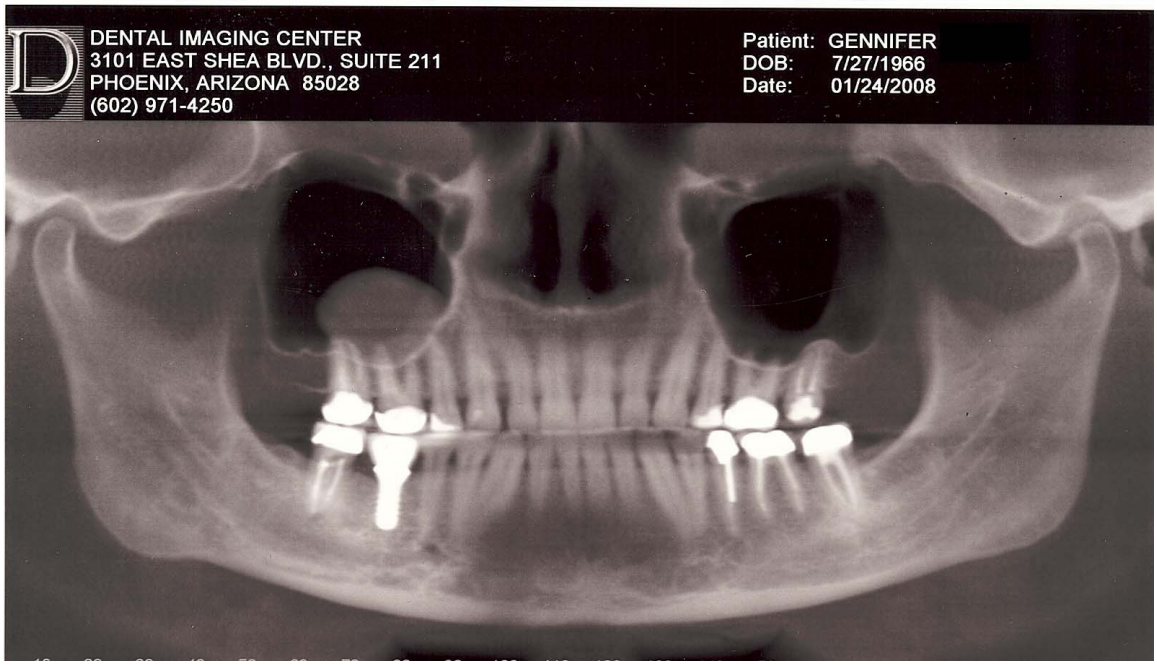
often the opposing teeth will manifest symptoms as well, due to extrusion of the tooth from increased pressure from the cyst.

The key question is: is this just a maxillary sinus mucus retention cyst, or is it something else? The vast majority of radiologists are competent to tell the difference between a cyst and something more ominous, like a tumor or a fungal infection. Dentists need to be certain that this is just a cyst. Patients are referred to an ENT to confirm the diagnosis of a cyst. A 3D Cone Beam CT sinus scan is far superior to plain film or panoramic imaging and is necessary to diagnose these cysts accurately. If the diagnosis is still ambiguous after a 3D Cone Beam CT sinus scan, then a biopsy would be necessary. In certain situations, a surgical procedure may be mandated to remove the cyst.

Below are recent images from diagnostic workups I performed for TMD/orthodontic patients in my practice showing the superiority of 3D Cone Beam Imaging versus traditional imaging. It is not difficult to tell the difference between the 3D Cone Beam image and the traditional. Traditional imaging is at the top.

Gennifer: Symptomatic mucous retention cyst of the right maxillary sinus
Tooth pain, cheek pain, eye tearing, allergies
Referred to ENT, who removed cyst and symptoms resolved





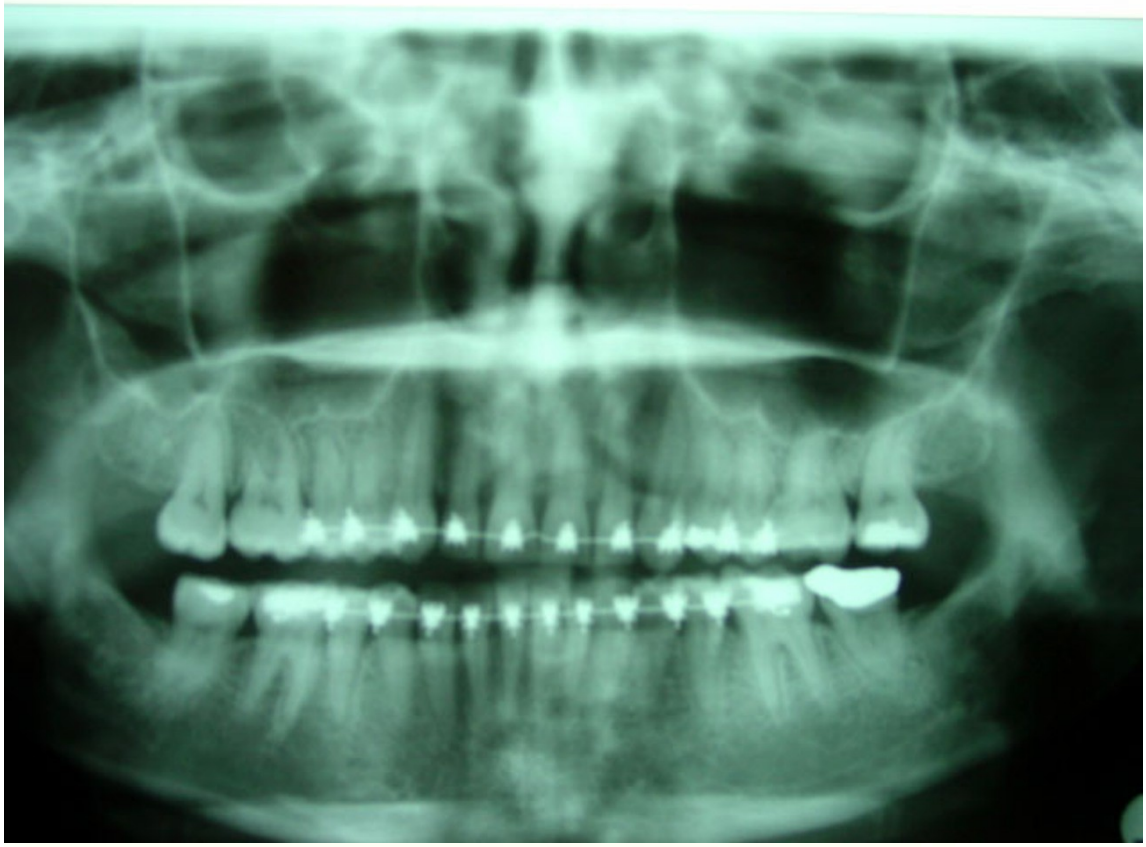
DENTAL IMAGING CENTER
3101 EAST SHEA BLVD., SUITE 211
PHOENIX, ARIZONA 85028
(602) 971-4250

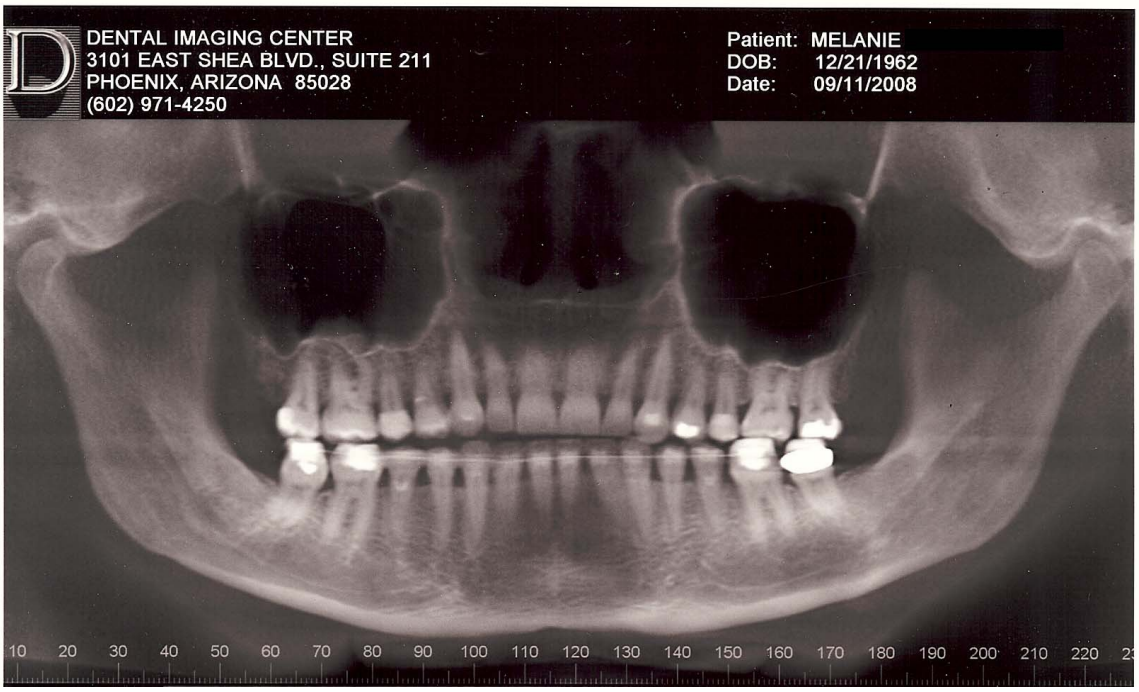
Patient: GENNIFER [redacted]
DOB: 7/27/1966
Date: 01/24/2008

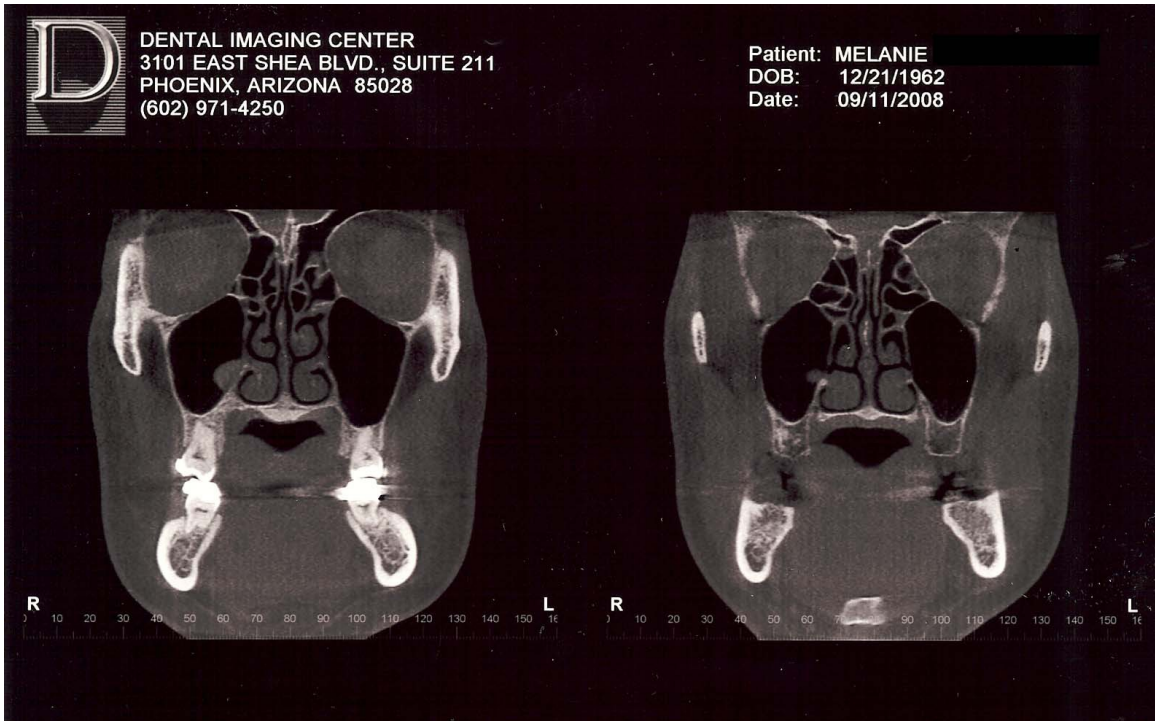
DENTAL IMAGING CENTER
3101 EAST SHEA BLVD., SUITE 211
PHOENIX, ARIZONA 85028
(602) 971-4250

Patient: GENNIFER [redacted]
DOB: 7/27/1966
Date: 01/24/2008

Melanie: Asymptomatic mucous retention cyst of right maxillary sinus






DENTAL IMAGING CENTER
3101 EAST SHEA BLVD., SUITE 211
PHOENIX, ARIZONA 85028
(602) 971-4250
Patient: MELANIE [redacted]
DOB: 12/21/1962
Date: 09/11/2008
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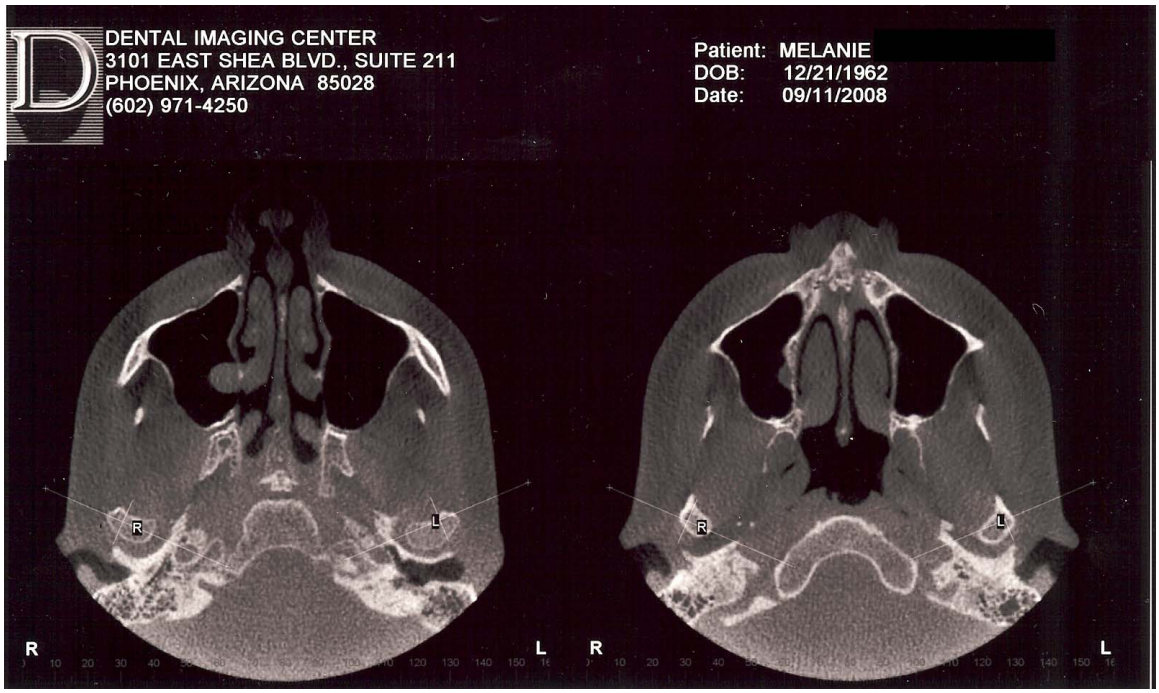
DENTAL IMAGING CENTER
3101 EAST SHEA BLVD., SUITE 211
PHOENIX, ARIZONA 85028
(602) 971-4250
Patient: MELANIE [redacted]
DOB: 12/21/1962
Date: 09/11/2008
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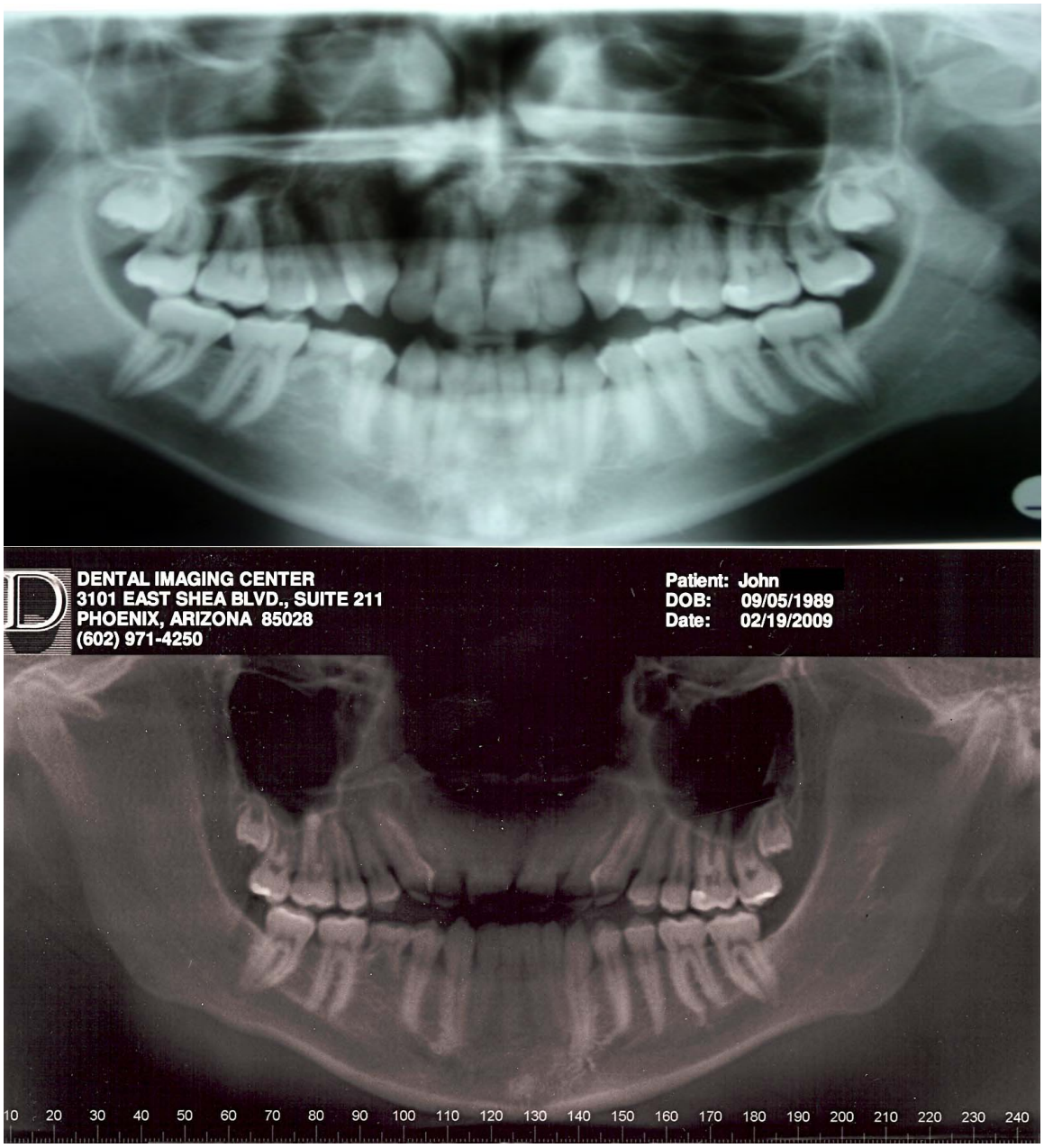
John: Asymptomatic mucous retention cyst of the maxillary sinus, bilateral



DENTAL IMAGING CENTER
3101 EAST SHEA BLVD., SUITE 211
PHOENIX, ARIZONA 85028
(602) 971-4250

Patient: John [redacted]
DOB: 09/05/1989
Date: 02/19/2009

DENTAL IMAGING CENTER
3101 EAST SHEA BLVD., SUITE 211
PHOENIX, ARIZONA 85028
(602) 971-4250

Patient: John [redacted]
DOB: 09/05/1989
Date: 02/19/2009