

Gold-wire artifacts on diagnostic radiographs: A case report

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ABSTRACT

This report described a case in which diagnostic radiographs showed irregular dense radiopaque strings and curved lines in the head and neck area. These artifacts could lead to misinterpretation since they may obscure anatomical structures and/or mask critical structures/pathologies. A more detailed history of the patient indicated that these strings originated from a facelift procedure in which a gold-wire technique was used. Considering that such intervention may cause a radiodiagnostic burden, it should be included in the anamnesis prior to radiography. (*Imaging Sci Dent* 2014; 44 : 81-4)

KEY WORDS: Radiography; Artifacts; Rhytidoplasty; Surgery, Plastic

In clinics, radiographs are routinely taken. Digital intra-oral radiographs are used along with other diagnostic methods to diagnose all kinds of problems, and artifacts in radiographs may influence the diagnosis. In the literature, different metallic artifacts such as bracelets, glasses, removable dentures, and piercings have been described.¹ Before taking X-rays, it is important to remove all metallic objects that could cause artifacts. However, sometimes, unexpected objects such as metallic foreign bodies inserted into the body during surgery or abandoned acupuncture needles might be hidden in the body and are less frequently described in the literature.² Recently, our department discovered rare irregular dense radiopaque strings, inserted during plastic surgery, on radiographs. These strings may lead to an incorrect diagnosis as they cause scattering on cone-beam computed tomography (CBCT) and therefore influence implant planning. Sometimes, artifacts other than the abovementioned strings may be observed on radiographs, making it difficult to obtain a good interpretation of the

image. This could well lead to misinterpretation, with all its consequences. Therefore, sufficient knowledge of the all possible types of artifacts is a primary requirement.

Case Report

A 76-year-old woman was referred to the Department of Periodontology at the University Hospital, Catholic University Leuven, Belgium. The patient consulted the department for a preoperative implant rehabilitation follow-up. During the consultation, she reported a vague toothache in her right maxilla. The medical history of the patient revealed hypertension and hypothyroidism, two chronic conditions that were being controlled by medication. The patient could not remember any further surgical intervention, apart from oral implant placement.

An extra-oral examination of the head and neck showed no obvious abnormalities (Fig. 1). An intra-oral examination revealed the presence of several implants in the posterior areas of the mandible and the maxilla, and natural teeth in the front. Neither periodontitis nor peri-implantitis symptoms were observed. Digital intra-oral radiographs (Digora[®] PSP imaged with Minray[®], Soredex, Tuusula, Finland) identified the subgingival caries on the canine

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Fig. 1. Photographs show a 76-year-old patient who presented with normal facial skin, with only few wrinkles on the cheek.

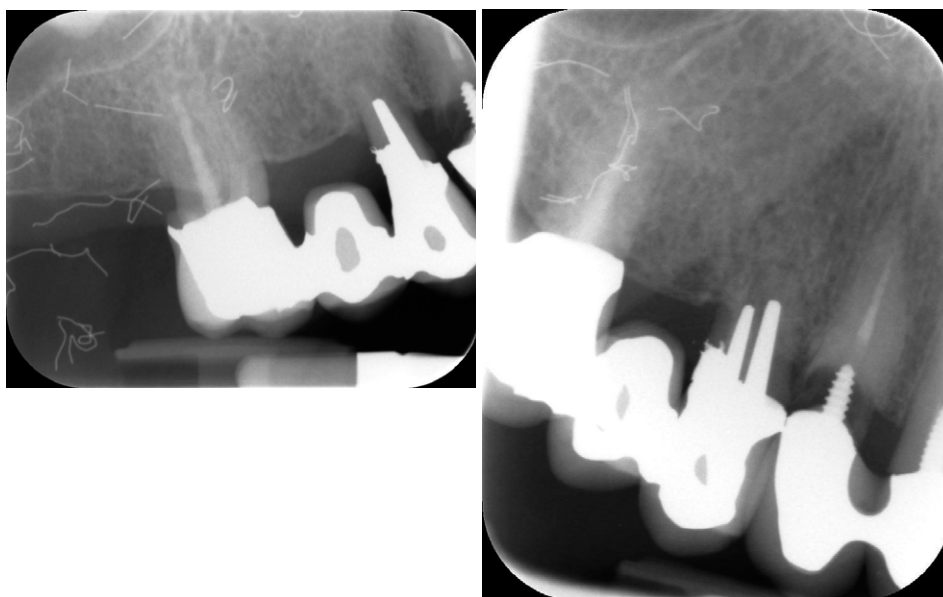


Fig. 2. Intraoral radiographs of the posterior part of the first quadrant show irregular strings and curved lines of a dense radiopaque material.

and the first premolar. The intra-oral images showed irregular strings and curved lines of a dense radiopaque material (Fig. 2). These foreign bodies demonstrated typical dense metallic characteristics.

As part of the implant therapy, a panoramic image (Veraview 2D, J. Morita Corp., Kyoto, Japan) was taken to verify the health of the maxillary sinuses, the absence of bone pathology, and the presence of sufficient bone height. On the panoramic image, irregular strings and curved lines of a dense radiopaque material were observed. Lines were observed bilaterally on the posterior part of the mandible,

maxilla, and ramus (Fig. 3). In order to plan the implant surgery, a three-dimensional (3D) Acuitomo® 170 CBCT (Morita Corp., Kyoto, Japan) was taken. This radiographic image confirmed the irregular strings of dense radiopaque lines, but now, they were clearly located in the soft tissues of the cheek, far away from the alveolar bone (Fig. 4).

In the differential diagnosis, various options were considered. A MEDLINE-PubMed search gave the following possible explanations for radiopaque marks in the lateral areas of the craniofacial area: synthetic hair braid extension artifacts,^{3,4} multiple miliary osteoma cutis,⁵⁻⁷ tonsillolith,⁸

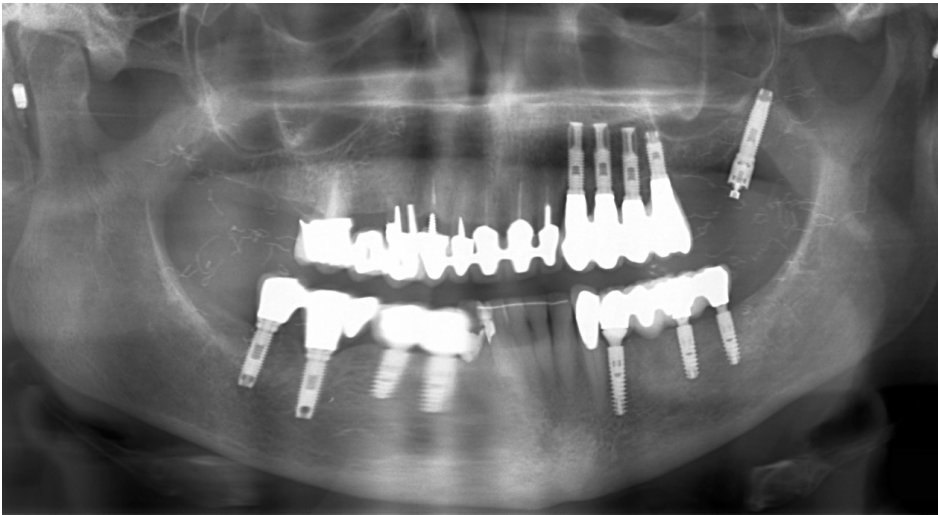


Fig. 3. A panoramic image shows irregular dense radiopaque strings on the left and the right side. The periodontal and peri-implant tissues seem healthy.

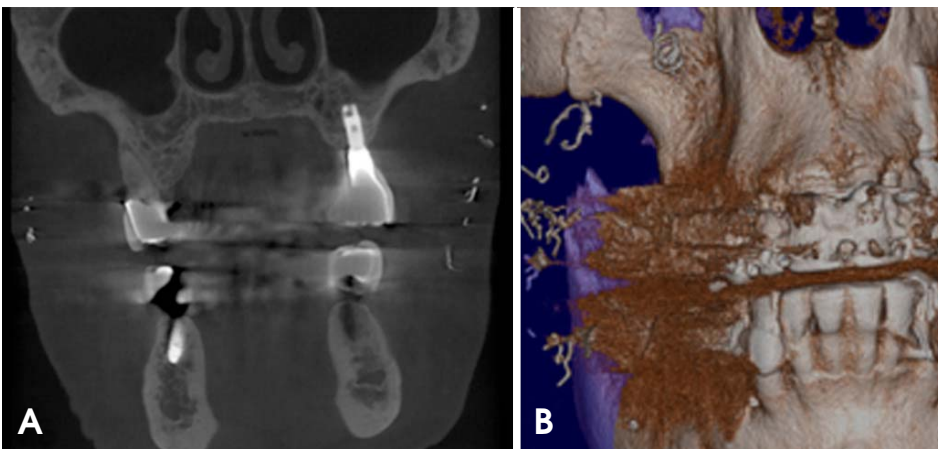


Fig. 4. A. A coronal cone-beam computed tomography image, on the position of the second premolar, clearly highlights the radiopaque structures in the left and the right cheek, lateral to the buccinator and masseter muscles. B. A three-dimensional reconstruction image clearly visualizes the gold wires, besides the artifacts caused by the implants and partial bridges.

acupuncture needles,² surgical clips, plastic surgery,⁹⁻¹¹ traumatic insertions (accidental insertions), and calcified phleboliths associated with soft tissue haemangioma.¹²⁻¹⁴

The medical history of the patient was re-explored. Now, the patient confirmed that she had undergone a kind of plastic surgery approximately 25 years ago. The physician could confirm that the patient had indeed undergone a face lifting procedure with gold-wire (thickness: 0.1 mm) in 1986.

Discussion

Different artifacts caused by artificial structures such as earrings, polish paste, piercings, and bracelets have been described.¹ The metallic foreign bodies described in this report are less common in Europe than in Asia. The literature yielded a couple of cases with this uncommon artifact. The first case was reported in 2008 with corresponding features on intra-oral images and panoramic views.⁹ Ano-

ther case report discussed a patient who was treated for rheumatoid arthritis by an acupuncturist with gold-thread acupuncture.² The radiographic images showed findings similar to those of the previously described case. The last case was of bilateral calcification caused by synthetic soft tissue augmentation of the cheeks with injectable silicone.¹¹

Nowadays, plastic surgeons have different options for soft tissue augmentation. The options can be classified as skeletal onlay grafts, subcutaneous volume enhancers, and dermal fillers.^{15,16} Autologous fat is commonly used as a subcutaneous volume enhancer.^{17,18} It can be added or removed. In the mid-1980s, dermal fillers were first used in the field of plastic surgery.¹⁹ Currently, there are 12 different dermal fillers available. Hyaluronic acid, collagen, and silicone are presumably the best-known dermal fillers.^{16,19} The radiodense features of these fillers have not been described. Only one article described the possibility that dermal fillers could generate radiopaque images.¹⁰

In the present case, the plastic surgeon used the gold-

wire technique. This procedure involves the use of gold wires (24 karat gold, diameter: 0.1 mm), inserted just below the surface of the skin.^{9,20} The gold-wire technique provides mechanical support to the tissues, and the foreign-body reaction triggers the production of elastin and collagen fibers around the wires. Further, new blood vessels are created and these lead to thicker and firmer skin, in order to reduce the wrinkles on the face. However, the success of this technique is doubtful as it is poorly documented in the literature, and since 2008, this technique has not been used anymore in France.²⁰

The gold wires used for plastic surgery or acupuncture could cause radiographic artifacts; therefore, the general practitioner should be aware of their application and radiographic appearance. A thorough medical history including questions on such therapies is recommended to rule out artifact burdening/masking specific to anatomical or diagnostic features.

References

1. Murray D, Whyte A. Dental panoramic tomography: what the general radiologist needs to know. *Clin Radiol* 2002; 57: 1-7.
2. Armstrong DT, Gilliland WR, Murphey MD, Salesky J. Clinical images: gold thread acupuncture for rheumatoid arthritis. *Arthritis Rheum* 2011; 63: 3021.
3. Brown RS, Coleman-Bennett MM, Jones-Matthews T. Synthetic hair braid extension artifacts in panoramic radiographs. *J Am Dent Assoc* 1998; 129: 601-4.
4. Scheifele C, Lemke AJ, Reichart PA. Hair artefacts in the head and neck region. *Dentomaxillofac Radiol* 2003; 32: 255-7.
5. Myllylä RM, Haapasaari KM, Palatsi R, Germain-Lee EL, Hägg PM, Ignatius J, et al. Multiple miliary osteoma cutis is a distinct disease entity: four case reports and review of the literature. *Br J Dermatol* 2011; 164: 544-52.
6. Gfesser M, Worret WI, Hein R, Ring J. Multiple primary osteoma cutis. *Arch Dermatol* 1998; 134: 641-3.
7. Goldminz D, Greenberg RD. Multiple miliary osteoma cutis. *J Am Acad Dermatol* 1991; 24: 878-81.
8. de Moura MD, Madureira DF, Noman-Ferreira LC, Abdo EN, de Aguiar EG, Freire AR. Tonsillolith: a report of three clinical cases. *Med Oral Patol Oral Cir Bucal* 2007; 12: E130-3.
9. Alsaadi G, Jacobs R, Quirynen M, van Steenberghe D. Soft tissue augmentation of the cheeks detected on intra- and extra-oral radiographs: a case report. *Dentomaxillofac Radiol* 2008; 37: 117-20.
10. Valiyaparambil J, Rengasamy K, Mallya SM. An unusual soft tissue radiopacity - radiographic appearance of a dermal filler. *Br Dent J* 2009; 207: 211-2.
11. Mupparapu M, Mozaffari E. Bilateral calcifications secondary to synthetic soft tissue augmentation of the cheeks: report of a case. *Dentomaxillofac Radiol* 2002; 31: 388-90.
12. Altuğ HA, Büyüksoy V, Okçu KM, Doğan N. Hemangiomas of the head and neck with phleboliths: clinical features, diagnostic imaging, and treatment of 3 cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2007; 103: e60-4.
13. Ikegami N, Nishijima K. Hemangioma of the buccal pad with phlebolithiasis: report of a case. *Acta Med Okayama* 1984; 38: 79-87.
14. Smith JF, Drake J, Sollee N. Massive oral hemangioma with phlebolithiasis. *Oral Surg Oral Med Oral Pathol* 1966; 21: 83-8.
15. Klein AW. Soft tissue augmentation 2006: filler fantasy. *Dermatol Ther* 2006; 19: 129-33.
16. Newman J. Review of soft tissue augmentation in the face. *Clin Cosmet Investig Dermatol* 2009; 2: 141-50.
17. Coleman SR. Structural fat grafts: the ideal filler? *Clin Plast Surg* 2001; 28: 111-9.
18. Carruthers J, Cohen SR, Joseph JH, Narins RS, Rubin M. The science and art of dermal fillers for soft-tissue augmentation. *J Drugs Dermatol* 2009; 8: 335-50.
19. Burgess CM. Principles of soft tissue augmentation for the aging face. *Clin Interv Aging* 2006; 1: 349-55.
20. goldthread.ru [Internet]. Cincinnati: Gold Thread Worldwide, c2007-2014 [cited 2012 August 5]. Available from: <http://www.goldthread.ru/eng>