Short Communication

An Unusual Case of Implant Failure

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A 67-year-old woman was referred with a rapidly progressing swelling in the left canine region of the edentulous mandible. Nine months earlier, 2 permucosal implants had been placed in her atrophic anterior mandible. A few weeks after implant placement, an inoperable carcinoma of the lung had been diagnosed. This tumor was treated with a combination of chemotherapy and radiotherapy. After 3 months, the implants were provided with a Dolder bar supporting an overdenture. Subsequently, progressive inflammation developed around the left implant and removal of the implant was necessary. When progressive swelling of the mucosa developed at the previous implant site, the patient was referred to an oral and maxillofacial surgeon. The swelling measured 35 mm in diameter and was biopsied. It was diagnosed as a metastasis of the lung carcinoma to the mandible. The tumor of the jaw was treated with local radiotherapy. *Int J Prosthodont 2007;20:51–54.*

Many pathologic lesions can arise in the oral mucosa or in the bone. It is inevitable that by chance some of these lesions will arise in tissues around implants. Dental professionals must be cognizant that some pathologic processes may mimic the "classic" appearance of implant failure. The following report documents the treatment of a 67-year-old woman in whom a lung tumor metastasis to the oral cavity was initially misinterpreted as normal bone healing in a portion of the mandible that had previously hosted an implant.

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Case Report

A 67-year-old woman was referred with a rapidly progressive swelling in the left canine region of her edentulous mandible. She had complete dentures for many years. Her dental practitioner had placed 2 implants in the anterior mandible 9 months earlier, which were loaded with a Dolder bar–supported overdenture 3 months after placement. Unfortunately, a progressive "inflammation" developed around the left implant 4 weeks after loading. Local treatment, consisting of curettage, was unsuccessful, and by 2 to 3 weeks later, extensive destruction of the peri-implant bone had occurred. A panoramic radiograph revealed considerable loss of peri-implant bone (Fig 1). Because of severe pain and the risk of fracturing of the mandible, the clinician removed the implant. In the weeks following removal of the implant, the surgical wound seemed to heal. However, 1 week before referral (2 weeks after removal), the patient returned to her practitioner with progressive intraoral swelling at the left implant site.

The patient history revealed that a few weeks after implant placement, she had been diagnosed with a tumor of the lung. Radiologic and histologic examinations led to the diagnosis of a sarcomatous squamous cell carcinoma of the right lung and hilus (Fig 2).

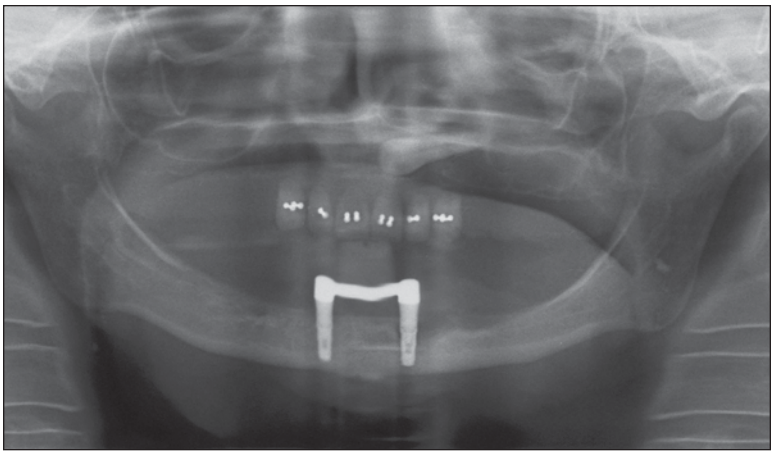

Fig 1 Panoramic radiograph showing periimplant bone loss around the mandibular left implant.

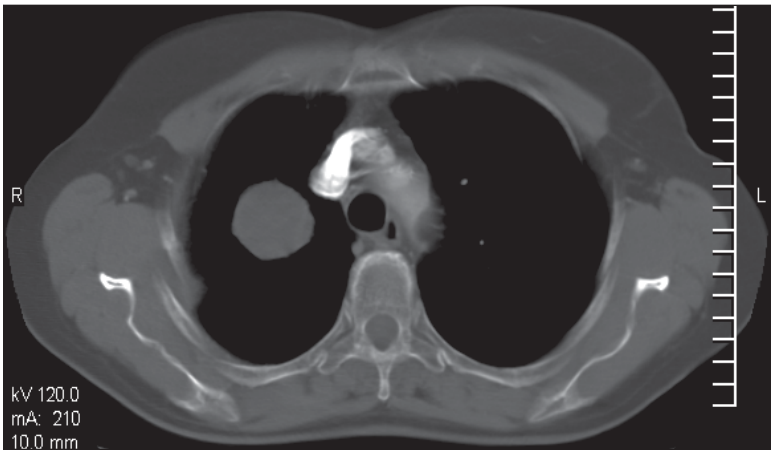

Fig 2 Computerized tomographic scan of the lung tumor.

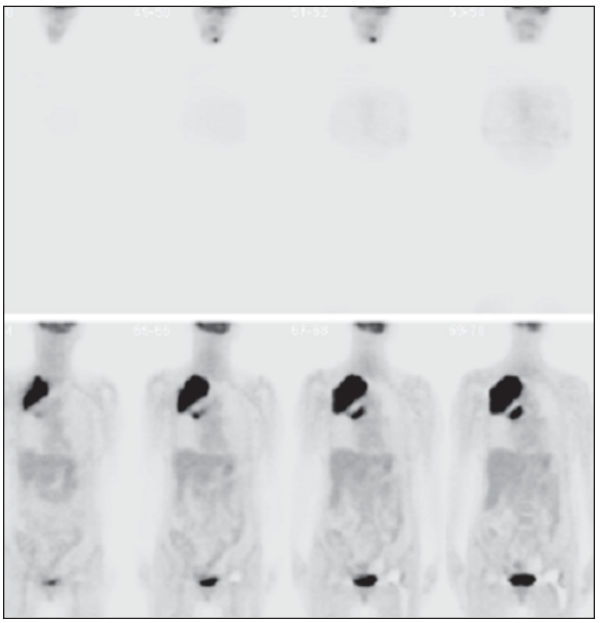

Fig 3 PET scans of the mandible *(above)* and the lung *(below)*.

Positron emission tomography (PET) with F^{18}-fluorodeoxyglucose (FDG) showed that the tumor was confined to the lung, and a small spot of activity in the mandible was also apparent (Fig 3).[1] This spot was attributed to an innocent dental cause, ie, bone healing around the implant. The tumor was classified as an inoperable $T_3N_2M_0$ carcinoma. Six months prior, the lung tumor had been treated with chemotherapy and radiotherapy. This resulted in partial regression of the tumor.

Physical Examination

The authors documented a healthy-looking patient who complained of intraoral pain and swelling in the region of the mandibular left canine. No extraoral swelling was visible, and the sensibility of the lower lip was normal. In the left canine region, a circumscribed ulcerating tumor, 35 mm in diameter, was present (Fig 4). Panoramic radiography revealed extensive bone loss in that area (Fig 5). A primary or metastatic (pulmonary) malignancy, an infection (osteomyelitis), and a benign tumor (giant cell granuloma) were considered as differential diagnoses.

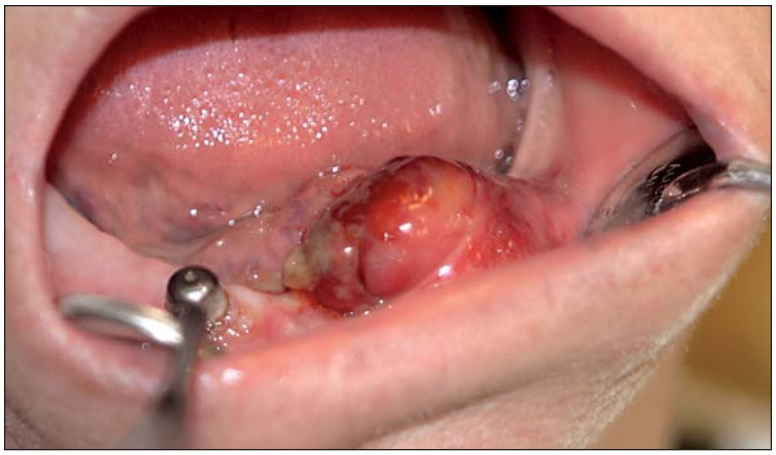

Fig 4 Clinical appearance of intraoral tumor in the mandibular left canine region.

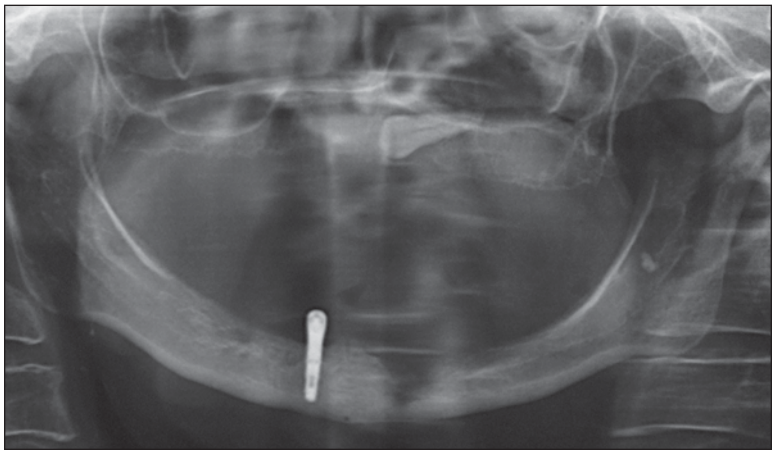

Fig 5 Panoramic radiograph after implant removal, showing loss of mandibular bone.

Histology

Biopsy of the tumor showed a poorly differentiated squamous cell carcinoma, which was identical to the pulmonary primary tumor. Therefore, the intraoral tumor was considered a metastasis of the lung carcinoma. Treatment of the presented patient consisted of radiotherapy to prevent pathologic fracture. The patient is regularly seen to maintain the comfort and quality of her remaining life.

Discussion

The oral cavity is involved in 5% of all malignancies.[2] Oral malignancies may be primary or metastatic tumors.[3] Intraoral primary tumors are most frequently squamous cell carcinomas or sarcomas.[4,5] Approximately 1% of all oral cancers are metastases from lung, breast, kidney, colon, or prostate cancers. Oral metastases probably occur via the bloodstream by entrapment of metastatic emboli.[2]

In most patients with oral metastasis, the distant primary tumor has already been diagnosed and metastases occur at other sites, leaving palliation as the only option. Prognosis is poor, with a median life expectancy of 6 months (range, 1 to 60 months).[4]

PET is based on the intravenous administration of tracers labeled with short-lived positron-emitting radionuclides.[1] These radionuclides become incorporated into tissue processes. PET has the ability to image these processes with the use of tracers such as FDG.[1] The radioactive tracers produce gamma rays, which are detected by a gamma camera. PET scans are used to image metabolic parameters of, for example, tumor tissue. From the acquired data, computerized images are generated to represent the quantitative spatial distribution of radioactivity in the body. The clinical application of PET enables the detection of areas of increased metabolism, such as primary tumors and metastases. However, benign processes with high metabolism, such as inflammation or (bone) healing, are also imaged. This is the reason why the mandibular activity, which was visible on the PET scan, was misinterpreted as reactive bone healing. PET scanning is expensive and thus not used routinely as an imaging technique, and its use is limited to specialized hospitals.

Severe inflammation with pathologic breakdown of peri-implant bone shortly after implant placement in the edentulous anterior mandible is rare. Although the chance of a primary or metastatic malignancy in the peri-implant region is small, and although bone loss, as in this case, may clinically mimic peri-implant inflammation, unusual lesions should be followed with suspicion and be referred for biopsy in a timely manner. Many classic cases of misdiagnosis can occur in the oral cavity. Dental professionals are well sensitized to the possibility that cancerous lesions may mimic the appearance of lesions of endodontic origin or periodontal abscesses. In cases of atypical presentation, progress, or response to therapy of a lesion, cancerous processes should form a part of the differential diagnosis and be investigated accordingly.

References

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Literature Abstract

Effect of chemical disinfectants and repair materials on the transverse strength of repaired heat-polymerized acrylic resin

The purpose of this study was to evaluate the in vitro effects of immersion in different chemical disinfectants and the type of repair material on the transverse strength of repaired heat-polymerized acrylic resin. Teflon rectangles with the dimension of 65 × 10 × 3 mm were invested in flasks with dental stone. The Teflon rectangles were subsequently removed from the stone, leaving rectangular-shaped cavities to be used as matrices for the heat-polymerized acrylic resin specimens. A total of 110 specimens were prepared using heat-polymerized acrylic resin. They were subsequently trimmed and hand-polished on one side with a no. 320 grit-silicon carbide paper and on the other with nos. 320, 400, 600 grit-silicon carbide papers. This protocol was to simulate both sides of a complete denture with an intaglio surface and a highly smooth surface. All specimens were stored in distilled water at 37ºC for 1 week. The specimens were then divided into 11 groups coded A to K, with group A being the control, groups C to F immersed for 10 minutes in 1%, 2.5%, 5.25% sodium hypochlorite, respectively, and groups H to K immersed in 2% glutaraldehyde for 10 minutes. After thoroughly washed and dried, the specimens were sectioned and ground to a butt joint until 10 mm of the total length of the specimen were removed. The specimens were placed back into the preparation mold. Groups C to F were repaired with heat-polymerized acrylic resin, while groups G to K were repaired with auto-polymerizing acrylic resin. After the repair procedures, the specimens were again immersed in the disinfectant solutions in the same sequence. The transverse strength was tested for failure using a 3-point bending testing device in a universal testing machine. Two-way analysis of variance (ANOVA) was used to test for differences among the groups. One-way ANOVA was also performed followed by the Tukey test at a 95% confidence level to compare the mean transverse strengths for the intact and repaired specimens. Two-way ANOVA indicated that the type of disinfectant solution was not a source of variance ($P = .271$). The repaired specimens treated with or without disinfectant had similar transverse strength values ($P > .05$). The intact specimens had significantly higher transverse strength ($P < .05$) than repaired specimens. The author concluded that the chemical disinfectants used in this study did not affect the transverse strength of the repaired specimens. Also, the type of repair materials (heat polymerized or auto-polymerized acrylic resin) did not affect the transverse strength of the repaired acrylic resin.

Ellakwa AE, El-Sheikh AM. *J Prosthodont* 2006;15:300–305. **References:** 39. **Reprints:** Ali M. El-Sheikh, Department of Prosthetic Dentistry, Dammam Central Hospital, Dammam Dental Center, Dammam, 31411, PO Box 188, Saudi Arabia. E-mail: ali1993@hotmail.com—*Beatrice Leung, University of Toronto, Toronto, ON, Canada*