

sult of the temperature of our food and is not always age-related. When the struts of a subperiosteal dental implant exteriorize and white slough is visible at the metal-tissue margin, in the absence of movement, pain, or pus, we should consider the possibility of oral-burn syndrome (OBS).

Suggestions of allergic reactions to metal or surface contamination—for example, those the Food and Drug Administration cited regarding former Brånemark fixtures (Nobel Biocare UK Ltd, Uxbridge, Middlesex, UK)—are less likely today. Occasional discomfort at the anterior border of the masseter muscle with subperiosteal frames is probably caused by the burning of those deep tissues. With unexplained pulp death below large metallic restorations and associated diffuse facial pains, OBS should be considered as a possible cause. Overheating of the bone during implant fixture surgery is unacceptable, but hot fluids and foods taken postoperatively are not listed.¹⁰

Poor sterility and inadequate care are commonly blamed for tissue sloughing, delayed healing, and other postoperative complications following implant, periodontal, and oral surgery, rather than the hot fluids and foods taken before local anesthetic has worn off. Yet routinely, children are warned not to chew on their lips or tongue after local anesthesia. Large metal bulk fixtures and castings undergo heat-expansion stress and can reach burning temperatures, perhaps resulting in failure of the fixture and screws. Thermal expansion of the composite is many times that of the tooth and should be considered a possible cause of postrestoration pain.

Persistent sore and receding gums; superficial periodontal and mucous membrane inflammation; mouth, throat, and peptic ulcers; lichen planus; leukoplakia; hyperkeratinization; herpes; angular cheilitis; oral and throat cancer; and many other lesions should all be considered relevant in terms of OBS. OBS should be explored as a cause of extraoral fistulae associated with the

soft tissues adjacent to the subperiosteal frames; these soft tissues culture common oral flora.

Heat is also an important concern in OBS. Researchers^{13,14} have measured the average temperature inside a cigarette by use of a thermocouple 1.5 cm from the lighted end to be 884°C. Loose incisors, McCall's festoons, implant loss, bone loss, and bone-graft quality loss are the common sequelae. Burns are 90% more susceptible to bacterial infection, preempting acute and chronic periodontitis¹⁵ and bone graft infections. Human tissue is burned when its temperature rises above 43.5°C.

In addition, hot beverages characteristically anesthetize the oral tissues,¹⁵ just as a hot bath numbs the skin by anesthetizing the peripheral nerve endings. When tissue is immersed in water at a temperature of 100°C for 10 seconds, the tissue retains heat, not returning to normal for 2½ minutes.^{13,14} Patients who habitually consume iced tea and salads and patients who are nonsmokers do not show the same tissue loss.

DISCUSSION

Hot beverages and foods, such as coffee, tea, soups, steamed pudding, pizza (which contains hot cheese), spaghetti, baked potatoes, fried fish, meat, and vegetables, are the most common enemies at temperatures above fingertip comfort. Significantly, patients who do not eat hot food are much less likely to experience implant degradation. An early implant case published in 1970 by Linkow and Chercheve⁵ is the first to illustrate osseointegration, with direct bone contact to a blade-form implant. This implant was fabricated in England by Down Brothers in 1969. Twenty-seven years later, the stable bone that surrounds that early implant shows little change. The patient's diet consisted of cool food and drink.

Another case shows a 3-year sublingual precancerous lesion healing within 12 days following the removal of metal dentures and crowns from the

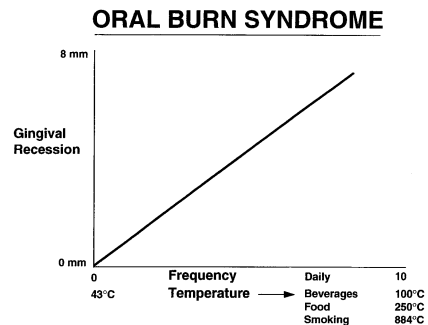


FIGURE 1. A direct link is indicated between oral tissue loss and the frequency and temperature of hot beverages, foods, and smoking.

area. Any metal work in the mouth acts as a conductor, intensifying the heat; and metal work exacerbates any surrounding damage. The cooked and deadened nerve endings feel little pain.

RESULTS

This study indicates a direct link between oral tissue loss and the frequency and temperature of hot beverages, foods, and smoking (Fig 1). The conclusions of any research in the mouth, nose, throat, chest, and stomach areas should be regarded with reservation if the temperature application to the area is excluded.¹⁶

CONCLUSION

Unfortunately, animal tests to further test OBS under controlled laboratory conditions are not possible. No animal will drink near-boiling water; only humans do. However, to ensure the integrity of oral implants, patients can be taught to perform a heat test before hot items are placed in the oral cavity. Testing can be performed using the fork-to-the-lip test or the finger test. The fork-to-the-lip test involves submerging the eating utensil, such as a fork or spoon, in the food and then touching the utensil to the lip. If it is burning hot, the food should not be ingested. The finger test involves inserting a finger in the food to test it, just as the liquid in an infant's bottle is routinely tested to prevent burning the child's mouth. If the finger cannot

touch hot items without pain, the food is too hot to eat.

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