Tetracycline bone fluorescence: a valuable marker for osteonecrosis characterization and therapy.

Abstract:
Differential diagnosis of osteoradionecrosis and bisphosphonate-related osteonecrosis of the jaw is primarily based on medical history, rather than pathogenesis or histopathology. This report aims to redress this shortcoming by demonstrating the advantages of tetracycline bone fluorescence as an aid to characterize osteonecrosis entities according to differential histopathologies. Furthermore, this technique facilitates the means to determine extent of necrosis and to optimize surgical therapy. Two patients with extended osteonecrosis of the lower jaw (osteoradionecrosis or bisphosphonate-related osteonecrosis of the jaw) were treated with partial mandibulectomy. After preoperative administration of doxycycline for 10 days, bone fluorescence was monitored intraoperatively to determine the resection boundaries. Fluorescence analysis correlated well with the specific histopathologic features of the 2 osteonecrosis entities. Bone fluorescence was predominantly observed in the cortical bone and cancellous bone regions in osteoradionecrosis and bisphosphonate-related osteonecrosis of the jaw, respectively. Margins of the osteonecrosis (and the resection) could be determined under fluorescence guidance; however, bone bleeding did not correlate with bone
fluorescence in both osteonecrosis entities. Given that viable but not necrotic bone displays tetracycline fluorescence, a notion that reflects the histopathology, more precise characterization of the 2 osteonecrosis types is enabled. Furthermore, even in extended cases of osteonecrosis requiring partial mandibulectomy, bone fluorescence helps to pinpoint the margins of resection and thus signifies an improvement of surgical therapy of extended osteonecrosis.