5 Hu JC, Coffin RS, Davis CJ, et al. A phase I study of OncoVEXGM-CSF, a second-generation oncolytic herpes simplex virus expressing granulocyte macrophage colony-stimulating factor. *Clin Cancer Res* 2006; **12:** 6737–47.

6 Mastrangelo MJ, Maguire HC Jr, Eisenlohr LC, et al. Intratumoral recombinant GM-CSF-encoding virus as gene therapy in patients with cutaneous melanoma. *Cancer Gene Ther* 1999; **6:** 409–22.

7 Diaz RM, Galivo F, Kottke T, et al. Oncolytic immunovirotherapy for melanoma using vesicular stomatitis virus. *Cancer Res* 2007; **67:** 2840–48.

8 Toda M, Rabkin SD, Kojima H, Martuza RL. Herpes simplex virus as an in situ cancer vaccine for the induction of specific anti-tumor immunity. *Hum Gene Ther* 1999; **10:** 385–93.

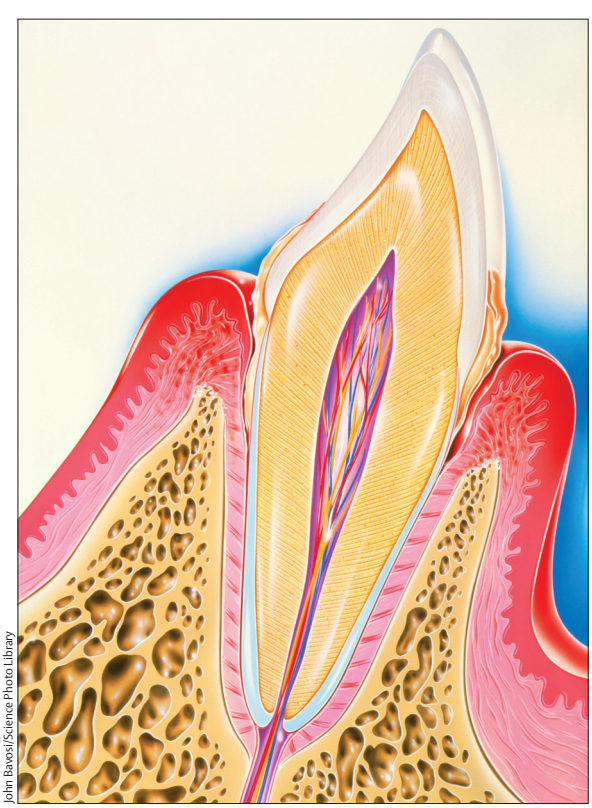
9 Apostolidis L, Schirrmacher V, Fournier P. Host mediated anti-tumor effect of oncolytic Newcastle disease virus after locoregional application. *Int J Oncol* 2007; **31:** 1009–19.

10 Errington F, Steele L, Prestwich R, et al. Reovirus activates human dendritic cells to promote innate antitumor immunity. *J Immunol* 2008; **180:** 6018–26.

11 Greiner S, Humrich JY, Thuman P, et al. The highly attenuated vaccinia virus strain modified virus Ankara induces apoptosis in melanoma cells and allows bystander dendritic cells to generate a potent anti-tumoral immunity. *Clin Exp Immunol* 2006; **146:** 344–53.

Vitamin D, periodontal disease, tooth loss, and cancer risk

Recent reports that periodontal disease and tooth loss are significantly correlated with several types of cancer[1,2] suggests a common mechanism, with possibilities such as immune function, response to inflammation, and bacterial infection proposed.[1,2] Although these suggestions are plausible, the underlying factor could, however, be vitamin D status. Periodontal disease, which is due to a bacterial biofilm that leads to tooth detachment due to acid leaching of calcium, is linked to low serum 25-hydroxyvitamin D (calcidiol) levels.[3,4] The cancers that have been shown to be significantly linked to periodontal disease or missing teeth—ie, bladder (marginally insignificant), gastric, haemopoietic, kidney, lung, oesophageal, oral, and pancreatic cancer—are also linked to low solar ultraviolet B (UVB) and calcidiol concentrations.[5–7] However, colorectal cancer, which was not shown to have a significant correlation with periodontal disease,[1] is also linked to low calcidiol concentrations.[5–7]



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Link between periodontal disease and cancer risk could be due to vitamin D

The mechanism by which vitamin D decreases the risk of periodontal disease involves induction of human cathelicidin, LL-37, expression by 1,25-dihydroxyvitamin D (calcitriol). LL-37 has modest direct antimicrobial activity under physiological conditions, but has been shown to have potent antiendotoxin activity in animal models, and the ability to resolve certain bacterial infections.[8] Although there are several mechanisms by which calcitriol can also decrease the risk of cancer, such as its effect on cells, angiogenesis, and metastasis,[9] an additional mechanism was recently proposed.[10] The suggestion was made that vitamin D, by induction of LL-37, decreases the risk of several cancers, including gastric and both Hodgkin's and non-Hodgkin lymphoma, by decreasing the risk of viral infections, such as Epstein Barr virus (EBV), which might lead to the development of such cancers. This hypothesis was based on a significant correlation between cancer mortality and the index of wintertime solar UVB in the USA, a time when EBV and many other viral infections are most common.[10] Additionally, Michaud and colleagues[1] suggest that lung cancer could also be linked to oropharyngeal bacteria infection by aspiration.

Thus, to extend the work on the link between periodontal disease, tooth loss, and the risk of cancer, measures of solar UVB irradiance and oral intake of vitamin D should be done and evidence of past viral or bacterial infection should be included in any analysis.

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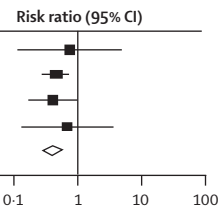
1 Michaud DS, Liu Y, Meyer M, Giovannucci E, Joshipura K. Periodontal disease, tooth loss, and cancer risk in male health professionals: a prospective cohort study. *Lancet Oncol* 2008; **9:** 550–58.
2 Meyer MS, Joshipura K, Giovannucci E, Michaud DS. A review of the relationship between tooth loss, periodontal disease, and cancer. *Cancer Causes Control* 2008; published online May 14. DOI:10.1007/s10552-008-9163-4.
3 Dietrich T, Joshipura KJ, Dawson-Hughes B, Bischoff-Ferrari HA. Association between serum concentrations of 25-hydroxyvitamin D3 and periodontal disease in the US population. *Am J Clin Nutr* 2004; **80:** 108–13.
4 Dietrich T, Nunn M, Dawson-Hughes B, Bischoff-Ferrari HA. Association between serum concentrations of 25-hydroxyvitamin D and gingival inflammation. *Am J Clin Nutr* 2005; **82:** 575–80.
5 Giovannucci E, Liu Y, Rimm EB, et al. Prospective study of predictors of vitamin D status and cancer incidence and mortality in men. *J Natl Cancer Inst* 2006; **98:** 451–59.
6 Grant WB, Garland CF. The association of solar ultraviolet B (UVB) with reducing risk of cancer: multifactorial ecologic analysis of geographic variation in age-adjusted cancer mortality rates. *Anticancer Res* 2006; **26:** 2687–99.
7 Boscoe FP, Schymura MJ. Solar ultraviolet-B exposure and cancer incidence and mortality in the United States, 1993–2000. *BMC Cancer* 2006; **6:** 264.
8 Mookherjee N, Rehaume LM, Hancock RE. Cathelicidins and functional analogues as antisepsis molecules. *Expert Opin Ther Targets* 2007; **11:** 993–1004.
9 van den Bemd GJ, Chang GT. Vitamin D and vitamin D analogs in cancer treatment. *Curr Drug Targets* 2002; **3:** 85–94.
10 Grant WB. Hypothesis--ultraviolet-B irradiance and vitamin D reduce the risk of viral infections and thus their sequelae, including autoimmune diseases and some cancers. *Photochem Photobiol* 2008; **84:** 356–65.

Errata

	Risk ratio	Lower limit	Upper limit	*Z* value	p value
Meyer[18]	0·704	0·121	4·091	–0·391	0·696
Lee[19]	0·509	0·329	0·789	–3·018	0·003
Hull[20]	0·438	0·188	1·017	–1·920	0·055
Deitcher[21]	0·690	0·124	3·832	–0·425	0·671
Overall	**0·509**	**0·351**	**0·737**	**–3·571**	**<0·0001***



Noble SIR, Shelley MD, Coles B, et al. Management of venous thromboembolism in patients with advanced cancer: a systematic review and meta-analysis. Lancet Oncol *2008;* **9:** *577–84.* In this Review the forest plot in Figure 2 is incorrect. The correct forest plot is shown.

Park B-H, Hwang T, Liu T-C, et al. Use of a targeted oncolytic poxvirus, JX-594, in patients with refractory primary or metastatic liver cancer: a phase I trial. Lancet Oncol *2008;* **9:** *533–42.* In this Article, the affiliation for co-author H M Pinedo should have been VUMC Free University, Amsterdam, Netherlands.