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Table 1. Root surface tumour extension in relation to RBD

Root surface	No.	RBD+	RBD−
Gross tumour	26	19	7
Microscopic tumour only	4	3	1
No tumour	13	4	9
Total	43	26	17

RBD = Radiologically demonstrable bone destruction: + = present, − = absent.

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Periodontal Space: Major Route to Bone in Oral Cancer

V.N. Bhattathiri, L. Sudha, B. Rajasekharan Pillai, A. Sudhakaran, K. Sasidharan and M.K. Nair

ORAL CANCERS involve the bone by invading and destroying the periosteum, and points such as the occlusal ridge and foraminae are natural routes of entry [1–3]. We report the preliminary observations of our prospective study, which suggest that one natural point of entry, the periodontal space, is the major route to both the maxilla and mandible.

We have so far studied 43 untreated patients with oral squamous cell cancers. All were dentulous, with primary tumours of the gingiva or an adjacent site growing onto the gingiva, and all had a "tumour touched tooth". 26 had lesions related to the lower and 17 to the upper gingiva, respectively. Bone involvement was assessed by radiography, both conventional views of the jawbones and intra-oral dental radiograph of the tumour-touched tooth. This tooth was then extracted, and its root surface inspected for the presence of tumour. Scrapings were taken from the root surface, and submitted for histopathology.

Table 1 summarises the observations. 30 (70%) patients had tumour extension on the root surface. The tumour was grossly visible in 87% of these cases, and extended from the level of gingival attachment to varying lengths along the root surface, to the tip. Radiography, despite a high chance of false negativity, is considered the primary investigation to diagnose bone involvement. The relation between periodontal spread and bone involvement, evidenced by radiologically demonstrable bone destruction is shown in Table 1. As many as 74% (22/34) of the patients with root surface tumour extension had radiologically demonstrable bone destruction, compared with only 31% (4/13) without root surface tumour extension. This correlation was statistically significant ($P < 0.01$, χ^2 test). Of the 4 patients with radiologically demonstrable bone destruction but no root surface tumour extension, 1 had involvement from a fixed submandibular lymph node, and in the other 3 the route was unknown. Of the 26 patients who had bone involvement, the periodontal space was the route of entry in 85% (22).

It is the cancers of the gingiva, buccoalveolar sulci and floor of mouth that are most likely to involve the bone. These cancers have the highest causal relation with tobacco chewing, a habit that also results in poor dental hygiene [4], and possibly leads to chronic periodontitis. Normally periodontal ligament is tough, and probably as resistant to tumour invasion as the periosteum, however, chronic periodontitis weakens the ligament and the surrounding bone, which becomes more susceptible to tumour invasion than the periosteum. Given the high frequency of periodontal spread and bone involvement in the present study, we suggest that in countries with a high incidence of oral cancers and associated poor dental hygiene, periodontal space is the major route to bone, as we previously hypothesised [5].

Our study identifies examination of the root surface of extracted teeth as a new investigation, helpful in diagnosing bone involvement. Whilst radiography cannot give histological confirmation, even when positive, root surface examination can. Therefore, root surface examination supplements, if not supplants, radiography in establishing bone involvement.

Correspondence to V.N. Bhattathiri.
The authors are at the Departments of Radiation Oncology, Dentistry, Pathology and Imageology, Regional Cancer Centre, Trivandrum 695011, India.
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