One of the most important aspects of preoperative staging in head and neck surgery is the preoperative determination of local bone invasion by the malignancy because prediction of the extent of the surgical procedure is very important for the surgical outcome. It is especially important if a tumour extends into bone structures, that is, the mandible, because it often requires a mandibulectomy. In addition, for such cases, the supero-inferior extent of bone invasion is important for the surgeon to plan for either marginal or segmental mandibulectomy.

According to current literature, the standard protocol for staging oral cavity malignancies includes multi-slice computed tomography (MSCT) and MRI of the head and neck, CT, conventional 2-plane X-ray of the chest and abdominal ultrasound. The results gathered from MSCT, MRI and CT are usually reviewed to determine whether local bone invasion has occurred. In 1998, cone beam computed tomography (CBCT) technology was clinically introduced, allowing 3-D diagnosis of the hard tissue of the face and jaws, third molars and salivary calculi; as well as other indications.

There is also evidence that CBCT is a potential tool in the assessment of facial skull bone invasion caused by oral cavity malignancies. Based on the newest data in the literature concerning the comparison of sensitivity and specificity, it can be concluded that
CBCT is superior to CT and MRI in the assessment of bone invasion by tumours in the maxillofacial region. Further advantages of CBCT imaging include lower radiation doses than MSCT and its ability concerning the anatomic assessment of the stomatognathic system.

Case report

This case report concerns a 55-year-old male patient suffering from oral squamous cell carcinoma (Fig. 1). The CT scan did not show any clear bone invasion in this case (Fig. 2). In order to obtain information that was more precise and to determine appropriate surgical planning related to the extent of bone invasion, a CBCT scan of the mandible was performed (SCANORA 3Dx, SORDEX, Tuusula, Finland). In the axial view (Fig. 3), it may be seen that the tumour had invaded the lingual mandibular cortex in the symphyseal region, extending up to the buccal cortex.

OnDemand3D image editing software (Cybermed) offers a tool for the quantification of measurements by using the ROI and Profile function. ROI analysis of the bilateral segments of the mandible showed a lower average grey scale value in the suspected osteolytic zone (Figs. 4 & 5).

After a detailed examination of the suspected mandibular bone invasion, a precise surgical plan could be compiled. Resection lines were determined according to the profile and ROI tool results (Fig. 6). In this case, a marginal mandibular resection was the treatment of choice, performed "en bloc" with a specimen taken by radical neck dissection (Figs. 7 & 8).

Conclusion

According to the adequate CBCT-based preoperative surgical planning, the tumour could be resected in toto, showing free margins in the non-resected area of the mandible.

Owing to its variability in imaging and resolution, CBCT could be of great importance in oncological surgery and diagnosis.

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