

Dental rehabilitation of a six-year-old boy with a rare tumour of the mandible

Thett Nyunt,¹ Katherine George,² Harpal Chana,³ and Graham Smith⁴

Neuroblastoma is the most common extracranial paediatric solid tumour and is derived from neural crest cells. It usually forms a mass in the adrenal medulla or anywhere along the sympathetic neural chain, with 50% of cases having distant masses detected at the time of diagnosis.

This article presents the case of a six-year-old boy who was diagnosed with an extremely rare form of a primary neuroblastoma in the mandible, and discusses his immediate and long-term management.

This required a multidisciplinary team approach involving paediatric medical oncology, surgical treatment and then adjuvant chemotherapy. Subsequent dental rehabilitation was with an implant-retained prosthesis.

Case report

A previously fit and well six-year-old boy presented to the department of maxillofacial surgery in June 2009 with a three-month history of an exophytic lesion of the anterior mandible.

Investigations included an incisional biopsy, fine needle aspiration of lymph nodes, bone scans, computed tomography (CT) from the skull base to the pelvis, ultrasound scan of the abdomen, and bone marrow aspirate. Figure 1 shows an axial view of the mandible.

A diagnosis of stage IV mandibular neuroblastoma was made. There was no evidence of distant metastatic spread. The case was discussed in a regional head and neck multidisciplinary team meeting (MDT) and a treatment plan was formulated. This consisted of rapid COJEC (cyclophosphamide, vincristine, carboplatin, etoposide protocol) therapy, an autologous bone marrow transplant, surgery and adjuvant chemotherapy.

The child underwent a total of eight cycles of chemotherapy preoperatively. This resulted in a reduction in the size of the lesion

prior to surgery. Following this he underwent a mandibulectomy from the LR6 to the LLE with resection of the overlying soft tissue (Figures 1 and 2) and a bilateral selective neck dissection (SND) levels I-III. The resulting defect was reconstructed with a left composite fibula free flap that provided both bone for mandibular reconstruction and skin for the oro-mucosal rehabilitation (Figures 3 and 4).

Histopathological examination showed residual neuroblastoma bilaterally in the mandible and invading adjacent soft tissue. Six of 40 lymph nodes were positive with one having extracapsular spread giving a pathological classification of pT₄N₂cM₀. Therefore, a further course of high dose chemotherapy was administered.

Clinical follow-up of the patient, including surveillance CT scans, showed that the patient remained well and there was no evidence of recurrence.

Dental rehabilitation

Four Nobelactive implants of 3.5mm diameter and 10mm length were placed in the premolar and lateral incisor region of the mandible. The fascio-cutaneous component of the free flap was positioned to enable the implants to emerge through non-mobile, keratinised mucosa. Healing abutments were placed. Nobelactive implants were chosen to facilitate early loading and prosthetic rehabilitation.

Two weeks later a temporary removable lower partial denture was constructed. A definitive removable lower denture was made two months later (Figure 5).

Unfortunately the retention was reduced as the denture proved to be a novelty for this young boy, which led to repeated removal to show his classmates. The abutments



Figure 1: Axial CT scan of mandible.



Figure 2: Excised lesion showing the expansion of the mandible.

¹ Thett Nyunt BDS, general dental practitioner, NHS/private practices.

² Katherine George BSc (Hons) BDS MBBS MFDS RCS(Eng) FRCS (OMFS) (Eng), locum consultant in oral and maxillofacial surgery at Kings College Hospital, London.

³ Harpal Chana BDS MSc FDS (Rest Dent) RCS Eng, part time NHS consultant, Kingston Hospital NHS Trust. He is also the lead clinician and specialist practitioner at the Malo Clinic in Teddington UK.

⁴ Graham Smith BDS MBChB FRCS(Eng) FRCS (OMFS) FDS RCS(Eng), consultant oral and maxillofacial surgeon, St George's Hospital, London and Kingston Hospital.

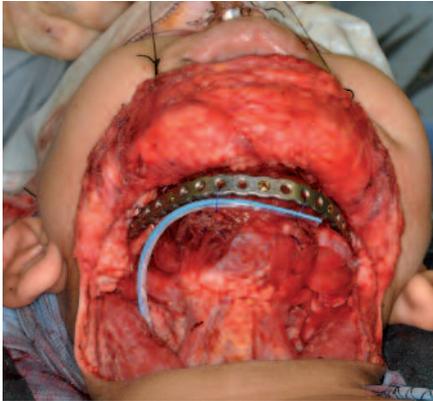


Figure 3: The reconstructed mandible showing the plate and fibular bone.



Figure 5: Orthopantomogram showing the position of the dental implants and the removable partial denture constructed two weeks postoperatively.



Figure 6: Patient shows good facial form six months postoperatively.



Figure 4: Intraoral view of the vascularised free flap immediately post op.

were changed and a fixed prosthesis provided. Six months review confirmed that the fixed prosthesis remain secure with good aesthetics, function and oral hygiene (Figure 6).

Discussion

Neuroblastoma is the most common extracranial solid tumour with a prevalence of 7% of all childhood malignancies. The peak incidence is at two years of age and in 1-2% of cases there appears to be linked family history of the disease (Lanzkowsky 2011). The prognosis of this disease is highly dependent on staging.

The diagnosis of primary neuroblastoma is very rare and only eight cases have been reported in the literature (Tang, Cohen 2009). The decision was made by the MDT to continue to treat it with surgery and adjuvant chemotherapy. A vascularised fibula free flap was chosen as this has proven to result in a reliable outcome with sufficient bone density and volume for placement of osseointegrated dental implants.

There will be future changes to the patient’s occlusion with continued growth and development. The majority of the mandibular growth occurs in the mandibular condylar growth plates, which have not been affected.

There is likely to be appositional growth that will result in burial of the reconstruction plate over time. In this case it

could be argued that early placement of dental implants may have compromised the construction of the final implant-retained denture as the implants may become positioned further lingually in relation to the maxilla and the edentulous ridge.

The study by Shmelzeisen et al (1997) found seven out of nine patients with immediate implants required further implant placement.

This may apply in this case as the child grows, however there have been improvements in the design and osseointegration of dental implants since that study. Bone grafting and orthognathic surgery could also have a future role once growth has been completed to maintain aesthetics and function. The risks of complications with removal of an embedded reconstruction plate will have to be considered (Phillips et al 2005).

References

Lanzkowsky (2011). Manual of Paediatric Haematology and Oncology. 5th Edition Elsevier
 Phillips JH, Rechner B, Tompson BD (2005). Mandibular Growth following Reconstruction Using a Free Fibula Graft in the Paediatric Facial Skeleton. *Plast Reconstruct Surg* 116(2): 419-424
 Schmelzeisen R, Neukam FW, Shirota T, Specht B, Wichmann M (1997). Postoperative function after implant insertion in vascularised bon grafts in maxilla and mandible. *Plast ReconstrSurg* 4: 719-725
 Tang PH, Cohen PA (2009). Primary neuroblastoma of the mandible. *Singapore Medical Journal* 50 (1): e5-e7

*Reprinted by permission of Implant Dentistry Today,
 © Finlayson Media Communications*