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Comparison of the clinical effects of treatment of osteochondroma by two types of vertical ramus osteotomy

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Abstract

The purpose of this retrospective study was to evaluate 10 patients with osteochondroma of the mandibular condyle who were treated by vertical ramus osteotomy. Three patients had resection of the condyle and reconstruction with free vertical ramus osteotomy grafts (free graft group) and seven had pedicled vertical sliding ramus osteotomy grafts (pedicled graft group). The mean (range) observation period was 30 months. All patients had satisfactory clinical outcomes, and facial symmetry and good occlusion were achieved during the first 10 months. However, slight facial asymmetry was observed in patients treated by free grafts at 11 months, as the mandible deviated to the operated side when the mouth was opened. Postoperative radiographs showed varying degrees of neocondylar resorption and reduction in height. Patients treated with pedicled grafts did not develop these symptoms, and had no bony resorption to speak of on radiographs taken during the follow-up period. In conclusion, the advantages of the pedicled graft over the free graft include less bony resorption and better long-term clinical outcomes.

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Keywords: Osteochondroma; vertical ramus osteotomy; reconstruction of mandibular condyle

Introduction

Osteochondroma (or osteocartilaginous exostosis) accounts for 36% of benign bony tumours and for 9% of all bony tumours.¹ Although in areas of bone and cartilage it is the most common benign tumour, in the head and neck it is rare because most craniomaxillofacial bones are of intramem-

branous origin.^{2,3} The mandibular condyle and coronoid process are the most commonly affected areas, particularly the medial aspect of the coronoid process.^{4–6} This benign, cartilage-capped growth is usually discovered incidentally on radiographic examination or on palpation of a protruding mass in the affected area. The radiographic image is one of a globular, radiolucent, lobulated mass that distorts the normal morphology of the mandibular condyle. Malocclusion and progressive facial asymmetry are common physical signs in most cases.⁷

The surgical treatment for osteochondroma of the mandibular condyle is condylectomy with or without simultaneous reconstruction of the condyle. If it is not reconstructed the vertical dimension may decrease on the affected side, and facial asymmetry, malocclusion (lateral open bite), and deviation of the mandible on mouth opening and laterognathia may develop. These symptoms are similar to those

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present preoperatively, but in the opposite direction. Condylar reconstruction after condylectomy is therefore necessary and recommended by most surgeons.⁸

Although many reconstructive approaches have been used, including arthroplasty (conservative approach), autogenous costochondral or sternoclavicular grafts, and total joint prostheses,⁹ it is generally thought that the vertical ramus osteotomy is an excellent technique for condylar reconstruction,^{10–14} as it allows immediate reconstruction, minimises the risk of infection, and avoids unpredictable growth of the costochondral graft. It also prevents possible complications at a different donor site.¹⁵

Unfortunately we still do not know enough about the clinical effects of vertical ramus osteotomy because reports are limited. In this retrospective study, we present postoperative follow-up data on 10 patients with osteochondromas of the mandibular condyle who were treated by two types of vertical ramus osteotomy: free vertical ramus osteotomy grafts (free graft group, n = 3) using a retromandibular approach, and pedicled vertical sliding ramus osteotomy grafts (pedicled graft group, n = 7) using the preauricular and retromandibular approaches.

Patients and Methods

Between 2007 and 2014, we treated 11 patients with osteochondroma of the mandibular condyle, three of whom (two women and one man, mean (range) age 42 (28–64) years) had condylectomy and condylar reconstruction by free graft using a retromandibular approach. The other eight patients (five women and three men, mean (range) age 44 (35–53) years) had condylectomy and condylar reconstruction by pedicled graft using the preauricular and retromandibular approaches. One of the pedicled graft group was lost to follow-up. All patients had facial asymmetry or malocclusion (ipsilateral posterior open bite, contralateral cross bite), and postoperative radiographs showed bony masses on the condyle (Fig. 1).

The data used for postoperative evaluation included frontal photographs and radiographs. In addition, we recorded occlusion and pain in the temporomandibular joint (TMJ), together with maximal mouth opening, degree of resorption, and facial symmetry both preoperatively and postoperatively.



Fig. 1. Radiographic image showing a bony mass on the right condyle.

Surgical technique

Before the operation we made a thorough cephalometric analysis and evaluated the dental model to make an acrylic surgical splint for each patient. All patients were operated on under general anaesthesia with nasoendotracheal intubation.

For the three patients in the free graft group, we made a vertical ramus osteotomy of the posterior border through a retromandibular incision with a reciprocal saw, followed by resection of the tumour with the condyle. Subsequently, after the rest of the free stump had been designed and a neocondyle created with a functional shape using a burr, the posterior mandibular border was replaced in the glenoid fossa as a free bone graft. One of the three patients was treated by compensatory contralateral intraoral vertical ramus osteotomy to obtain good occlusion. For the eight patients treated by a pedicled graft, the area of the TMJ was approached through an extended preauricular incision and the tumour was resected by condylectomy under direct vision through a preauricular incision. The vertical ramus osteotomy was made through a retromandibular approach on the affected side, with a reciprocal saw. Three of the eight patients were also treated by compensatory contralateral intraoral vertical ramus osteotomy to obtain good occlusion. After the stump of the condylar neck had been trimmed to a functional shape using a burr, the posterior mandibular border that was pedicled on the medial pterygoid muscle was moved superiorly and placed in the glenoid fossa.

For each patient the articular disc was preserved whenever possible if it was in good condition. An acrylic surgical splint, previously made from study models, was verified and inserted between the maxilla and the mandible to obtain a stable new dental occlusion. Rigid fixation was then used with two titanium miniplates. Five patients had the affected angle and lower border of the mandible reshaped for cosmetic reasons with two weeks of intermaxillary fixation, and five started orthodontic treatment 4 weeks' postoperatively.

Results

The mean (range) period of observation was 30 months, and there were no operative or postoperative complications during that period. Seven patients had pain in the TMJ before operation but it disappeared afterwards.

The three patients treated by free grafts had satisfactory facial symmetry and occlusion during the first 10 months (Fig. 2A), but they developed slight facial asymmetry after 11–12 months and the mandible deviated to the operated side when the mouth was opened (Table 1). As shown in Fig. 2B, varying degrees of neocondylar resorption and reduction in height are apparent in the radiographs.

The seven patients treated by pedicled grafts had good facial symmetry and occlusion postoperatively and remained stable during the observation period. There was no obvious

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