

ALVEOLAR OSTEOTOMY FOR CORRECTION OF ANTERIOR OPEN BITE

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ABSTRACT

Changes in the intimate relationship of the jawbones lead to dentofacial deformities. Orthognathic surgical interventions attempt to return the hard and soft tissues to normal relationship and thereby enhance facial appearance in addition to improving function. Skeletal open bite is characterized by a noticeable vertical disproportion of the face with changes in the soft tissue and bone. Several suggestions for its correction have been made in the past; the original operation being described by Wassmund in 1935⁷. This procedure is recommended in patients with marked anterior open bite and sound anterior teeth. The surgery is carried out in the upper first premolar region after which the anterior segment is repositioned.

Key words: Maxillary protrusion, Anterior open bite, incompetent lip seal, Alveolar osteotomy.

INTRODUCTION

The jaws constitute a sizeable portion of the facial skeleton; and changes in the intimate relationship of those facial bones, however, small, may produce malformations¹. And it is known that physical appearance has a very great impact on self-esteem, happiness and successful personal interactions. For this reason, many patients with dentofacial deformities seek orthognathmic surgery treatments, which enhance facial appearance.

Skeletal open bite is characterized by a noticeable vertical disproportion of the face with typical changes in the soft tissue and bone. The lips are incompetent and tongue is often protruding, with tooth contact sometimes only in the molar region. The anterior open bite has been classified into dental and skeletal open bite²⁻⁴; and its management has confused and frustrated clinicians, orthodontists and surgeons alike,

more than any other dentofacial deformity⁵. Several suggestions for its correction have been made in the past; some have been tried, and every now and then failures have been reported⁶.

Wassmund technique⁷ has been found to maintain an excellent dual vascular supply of the anterior maxillary segment by preserving both palatal and labio-buccal soft tissue pedicles.

The aim of the paper is to report the surgical management of a severe case of anterior open bite arising from a Class II division I malocclusion after a prolonged attempt to correct the condition orthodontically within 5-6 years.

CASE REPORT

A 19-year-old male sickler was referred by his orthodontist on 9 November 2000 for management of

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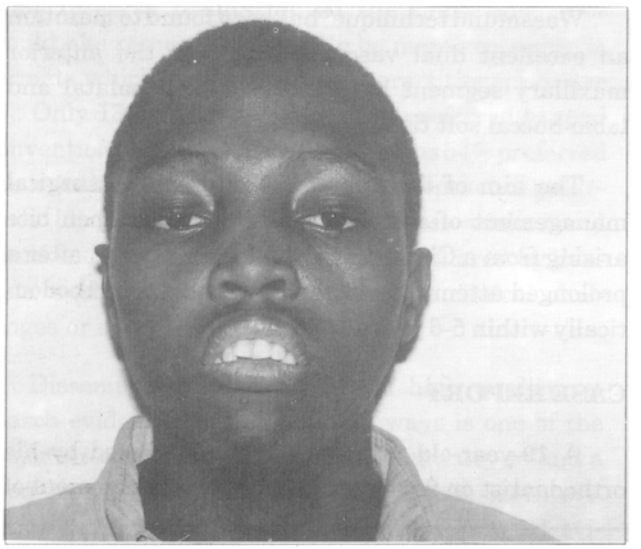
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a severe anterior maxillary protrusion with open bite. The patient had been commenced on orthodontic treatment at 13 years of age, but after a long time without any appreciable result, the parents sought a surgical option. The patient and his parents were counseled on the need for a multidisciplinary approach with a combination of surgery and orthodontics but due to traumatic orthodontic experience the patient and his parents opted for surgery alone.

Examination revealed a young male of 19 years, pale and anxious, and with an obvious facial disfigurement. There was a degree of hypertelorism, the lips were incompetent (Fig 1), and both lips were crusty and dry. The upper anterior teeth were in severe protrusion. All teeth were present, and there was no caries on any tooth. The molar relationship was class 1 Angel's classification and there was spacing between the canines and premolars on either side. An abnormal bulge was evident near the anterior nasal spine. The anterior open bite was so wide that the inter-incisal space measured about 15mms at rest (Fig 2).

Haematological survey was carried out including the following tests: Packed cell volume, haemoglobin, full blood count, blood chemistry with emphasis on calcium, phosphorous and alkaline phosphatase levels, electrolytes and urea, sickling



and genotype, and screening for HIV/AIDS.

Fig 1 Preoperative full face view of patient showing incompetent, dry and cracked lip mimicking cheilitis solaris. Note also the increased intercanthal distance.

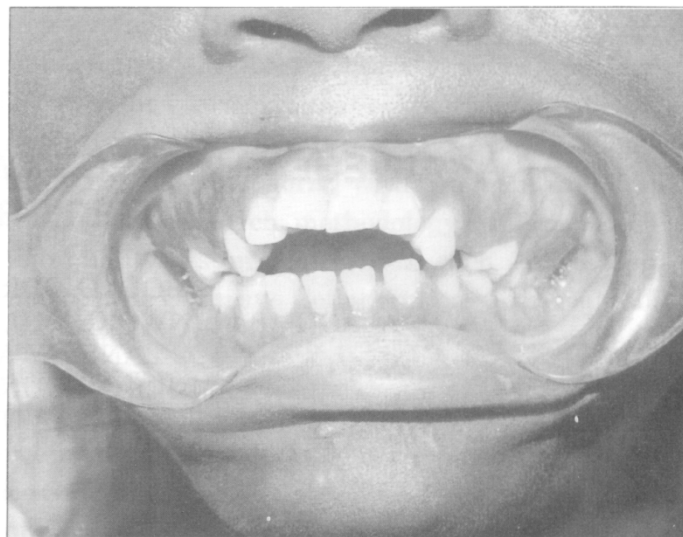


Fig 2a

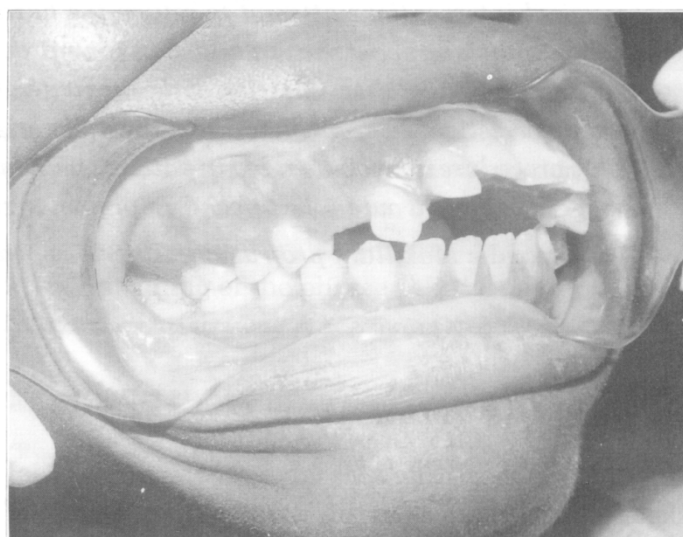


Fig 2b

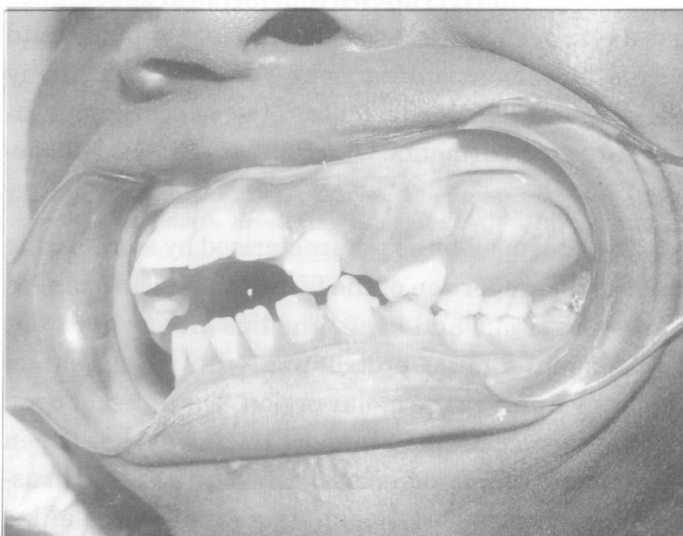


Fig 2c

Fig 2 a, b & c Preoperative view of the occlusion a) front b) lateral right and c) lateral left. Note the wide diastema between the canines and first premolars.

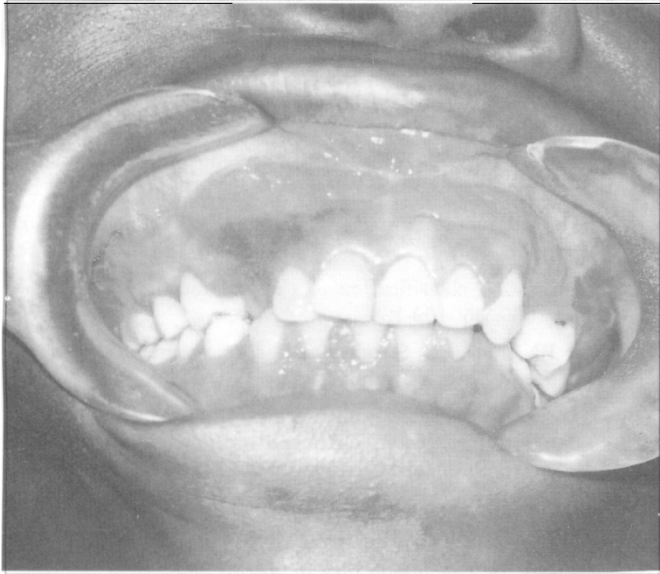


Fig 3 View of occlusion 10 weeks postoperatively. The arch bar had previously been removed at 6 weeks.

The haemoglobin level was 7.3gms, the patient was HIV negative (Eliza and Western Blot tests) and all other laboratory parameters were within normal values.

Upper and lower alginate impressions were taken for a model surgery and orthognathic relator. The models were duplicated and a padsaw was used to section the models after the first premolars were removed from either side of maxillary cast. A transverse cut was made above the apices of the upper anterior teeth and the casts were reassembled and fixed in place with soft wax. The upper and lower casts were now mounted in class I relationship on an articulator. Cephalometric tracings were reviewed with the patient's orthodontist and additional radiographs ordered.

TREATMENT

On 8 January 2001 the patient was admitted into the hospital and after an anaesthetic review, the patient was transfused with one unit of whole blood while another two units were made available for surgery the following day.

Anaesthesia was induced through a nasal endotracheal tube. Using Was smund Technique', a vertical incision was made in the inter-dental space immediately anterior to the mesial bony margin of the planned osteotomy

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The incision was carried superiorly into the depth of the vestibule and directed such that the line of closure was positioned over the bone. The latero-inferior portion of the bony anterior nasal aperture was visualized by a subperiosteal tunneling. A vertical incision overlying the anterior nasal spine was carried inferiorly about 3mms above the free gingival margin. The second premolar was extracted on either side of the maxilla, while a measured vertical section of alveolar bone was excised with a fissure bur. The buccal bone incision was carried 4mms above the adjacent canine apex and then angled medially to the infero-lateral part of the piriform rim. The wound was packed for haemostasis and the contralateral side was treated similarly.

Lateral, palatal and transpalatal osteotomies were completed through the vertical osteotomy sites. A palatal subperiosteal tunneling was developed and the palatal bone was sectioned transversely from the vertical osteotomy site of one side to the opposite side. The anterior maxilla was mobilized with posterior and inferior digital pressure. A complete mobility and separation was achieved using an osteotome and removing an amount of bone. Arch bar splints were used on the upper jaw and immobilization of the fragment maintained for six weeks.

Blood loss was roughly 400mls, and patient was given two units of whole blood.

The procedure was well tolerated. The patient had 8mgs Dexamethasone intravenously during the operation followed by two doses of 4mgs Dexamethasone 12 hourly after surgery. This was to minimize post-operative oedema. One gram Rocephin intravenously was recommended daily for five days, pentazocine 30mgs intramuscularly twice daily for pain while folic acid and vitamin supplements were administered routinely for two weeks. Soft diet of high protein was recommended.

Surgery was uneventful in the immediate post-operative review with all vital signs stable. 12 hours postoperatively, the patient had a bout of malaria, which responded adequately to an administration of 5cc Chloroquine and 25mgs Phenergan statim. The patient was given additional anti-malarials for another 2 days.

The patient was discharged on the tenth postoperative day for a fortnightly review when the wires were adjusted accordingly. The splints were removed at six weeks and postoperative photographs were taken (Fig 3).

DISCUSSION

There is hardly a dentofacial deformity that has confounded and frustrated orthodontists and maxillofacial surgeons than the treatment of open bite^{2,8-11}. Indeed, because of its complexity, attempts have been made to regard it as an independent clinical entity, and has been referred to as "open bite syndrome"⁵.

There are various surgical procedures to correct open bite; these include osteotomies of the mandibular body¹², ascending ramus⁸, total maxillary osteotomy^{13,14}, and segmental osteotomies of the maxilla^{7,9} and mandible^{15,16}. In spite of all these, none has produced completely satisfactory results as there is often still a high incidence of relapse^{6,17}. Today, attempt is made to correct open bite with bimaxillary osteotomies^{18,19}, and stabilize with bone-plating.

It would appear therefore that the decisive point in managing skeletal open bite is not so much in the surgical technique employed, but in the careful diagnostic evaluation.

A single stage procedure has been used in this case and the result has been satisfactory. Wassmund technique has been found to maintain an excellent dual vascular supply of the anterior maxillary segment by preserving both the palatal and labio-buccal soft tissue pedicles. The facial profile has improved, and the lips are now competent following regular muscle training. The occlusion has remained unchanged satisfactory with reasonable overjet and overbite 23 months after surgery.

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