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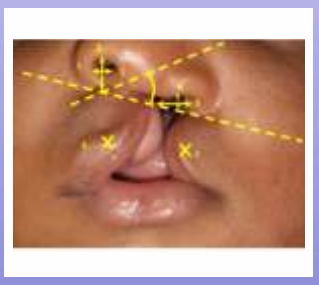
PAR and self reported improvement of malocclusion



Orthodontic considerations of children with special needs

Pre-surgical infant orthopedics experience in LUTH

Management of bimaxillary protrusion

Orthodontic management of severe crowding

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"DENTISTRY'S FIRST SPECIALTY JOURNAL IN SUB SAHARAN AFRICA"

Case report: Management of Angles Class I Malocclusion with Bimaxillary Dentoalveolar Proclination

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Abstract

A 31- year- old Ghanaian lady presented with a chief complaint of diastemata. The clinical examination showed a flat profile, with prochelia of the upper lip using the rickets aesthetic E line, a class I malocclusion with bi-maxillary Dento-alveolar proclination, retained deciduous tooth, ectopic premolar and multiple spacing.

Extraction of the deciduous tooth with auto-transplantation into a prepared socket of the deciduous tooth, with subsequent space closure. The active treatment was Eighteen (18) months.

Keywords: Angles Class I malocclusion, Bimaxillary proclination,

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ORIGINAL ARTICLE

Introduction

Bmaxillary dentoalveolar proclination is the condition where the upper and lower dental arches are proclined, thus increase lip fullness.

Patients with bimaxillary proclination may demonstrate increased incisor proclination and protrusion, a vertical facial pattern, increased procumbency of the lips, a decreased nasolabial angle, and thin and elongated upper and lower anterior alveoli.

In 1897 the term bimaxillary protrusion was coined by Calvin Case, describing "a condition in which the entire dentures of both jaws are protruded in relation to the mandible and other bones of the skull", and that "a receding chin always aggravates this deformity".

Another definition describes bimaxillary protrusion as "a condition characterised by protrusive and proclined upper and lower incisors and an increased procumbency of the lips

A primary tooth is retained beyond the time of normal exfoliation in some cases. This results in an extended life for that tooth which usually has a good crown, roots, and supporting alveolar bone, and can offer an adult patient many years of service. However, persistent teeth can lead to some clinical problems, including periodontitis, profound caries, and

ankylosis, and in most cases, tend to push the permanent teeth out of the arch perimeter, making them ectopic.

Diastemata are gaps found in between teeth. In adults, the aetiology is varied - arranging from the size of the teeth in relation to the jaw, missing or microdontic teeth, oversized labial frenulum, habits, and many more. Treatment is usually not necessary for medical reasons, but most times, for purely cosmetic or aesthetic considerations. The presence of these various conditions may lead to malocclusion, which may require orthodontic treatment.

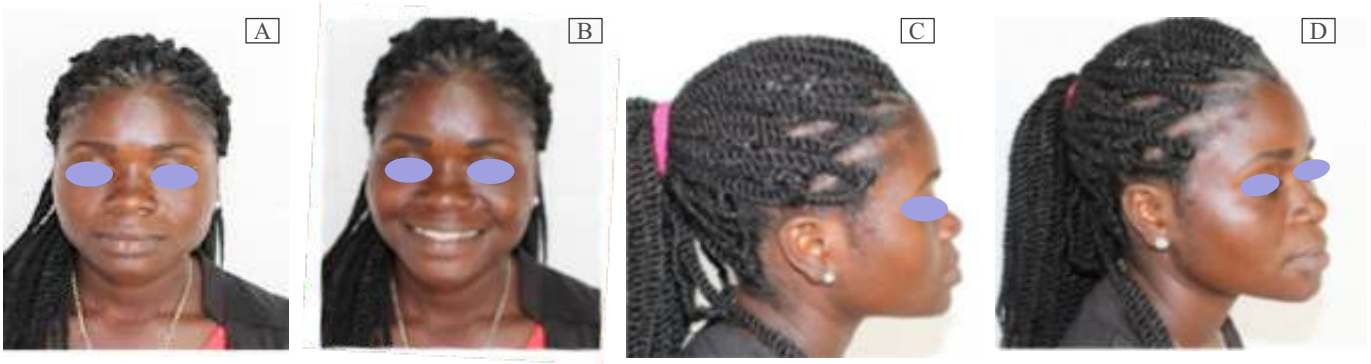
Presenting Complaint

A 31-year-old Ghanaian female patient presenting at the Komfo Anokye Teaching Hospital in Kumasi,

Figure 1

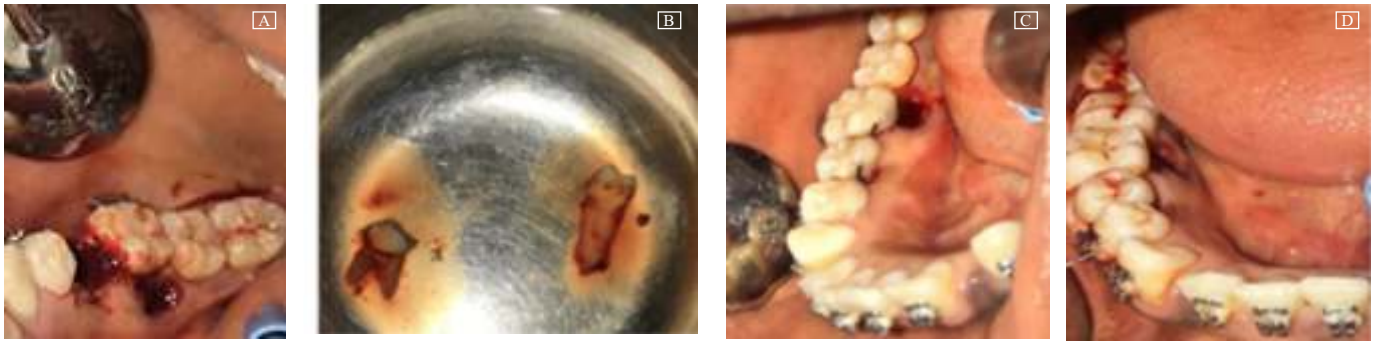
Figs. A and B show ectopic premolar and deciduous second molar, C shows the root-treated transplanted second premolar

Figure 2: Pre-treatment facial and intraoral photographs



A-Frontal view, B- lateral view, C posed smile, D- ¾ view

A-maxillary occlusal view, B-left lateral view, C- right lateral view D- frontal view, E- mandibular occlusal view



A - Sockets of extracted deciduous tooth and ectopic tooth,

B - extracted teeth in normal saline in a kidney dish,

C - transplanted premolar slanted to 44 and 46, with 0.4mm stainless steel wire

D - post-op day 7, after wire splint removal

with the chief complaint of multiple spaces in the anterior maxillary and mandibular region

Medical and Dental History

There was no significant medical history, but past dental history revealed an episode of gingival swelling around the right mandibular first 1st molar region.

Diagnosis

Clinical Assessment

Extra oral findings: examination showed a flat profile with prochelia of the upper lip, facial symmetry and a mesocephalic. Lips were competent with equal facial proportions (figure 2)

Intraoral findings

Examination showed full complement of adult dentition with a retained deciduous second molar in the right mandible, and a lingually placed second premolar spacing in the maxillary and mandibular anterior regions, distal to the laterals. There was an edge-to-edge bite and enamel wear from attrition (figure 2)

The clinical examination suggested Canine guidance with no temporomandibular joint symptoms.

Radiographic Assessment

Panoramic findings - this revealed all teeth in permanent dentition with a retrained deciduous tooth. Periapical findings revealed no root resorption, Caries or periapical lesions(figure 1)

Cephalometric findings (figure 4 and table 1)

Bimaxillary Protrusion

Bimaxillary Dentoalveolar Proclination

Skeletal class III base

Normal vertical proportions

Treatment Objectives

Address deciduous 85 and ectopic 45

Correct rotations of teeth

Normalize overbite and overjet

Level and align arches and close spaces

Address maxillary and mandibular incisal attrition

Reassess and Retain corrected results

Treatment alternatives

Two alternatives were presented to the patient

1. Combined orthodontic and restorative treatment with the extraction of both deciduous tooth and ectopic premolar, with subsequent replacement of extraction space with a prosthesis.
2. Or orthodontic treatment with transplantation of ectopic premolar into the extraction space of the deciduous tooth.

   After a review of the risks, benefits, and financial implications, the patient chose the second

alternative because she wanted to have her full set of teeth, for religious beliefs and because the cost of the prosthesis was not affordable to her.

Aetiology of the Malocclussion

Primary – 1. Skeletal
Secondary - 2. Dento-alveolar and
3. Dental

Clinical Diagnosis

Plaque-induced gingivitis
Retained deciduous 85
Ectopic 45
Maxillary and mandibular labial segment diastemata
Bimaxillary Dento-alveolar Proclination
Bimaxillary Protrusion

Treatment progress

Orthodontic treatment began on the 4th of February 2019, with preadjusted 0.022-inch brackets with MBT prescription were bonded, engaged with 0.014-inch nickel-titanium archwire ligated to all maxillary and mandibular teeth, except the deciduous and ectopic teeth. Both arches were levelled and aligned, beginning with 0.014-inch nickel-titanium arches, and progressing up to 0.019x0.025-inch stainless steel archwires (Table 2).

The deciduous tooth and ectopic premolar were extracted by deepening the extraction socket of the deciduous tooth to accommodate the roots of the premolar. The implanted tooth was splinted with a 0.4mm stainless wire, while the composite lingual and root canal was commenced on the 7th Day (Figure 3).

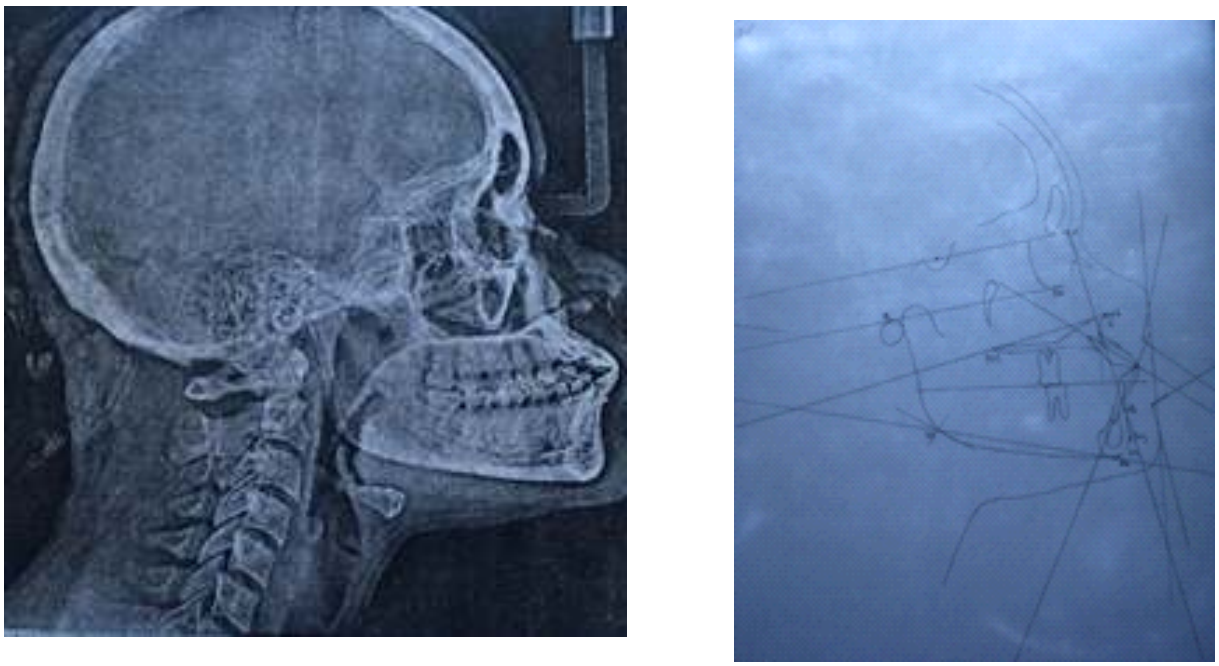


Figure 4. Lateral Cephalogram and Cephalometric Tracing

Table 1. Pre Treatment Cephalometric Values

Parameter	Patients Values	Ghana (Fadeju et al, Dec 2012)
Skeletal (Sagittal)		
SNA	94°	88.60° ± 4.02°
SNB	94°	83.34° ± 3.38°
ANB	0°	5.37° ± 2.24°
Wits Analysis	7mm	3.58° ± 2.55 mm
Dento-Alveolar		
UI-MxPl	130°	120.94° ± 7.13°
LI-MnPl	108°	98.74° ± 7.98°
UI-LI Angle	98°	112.76° ± 10.12°
Vertical		
MxP-MnP Angle	26°	27.84° ± 5.78°
SN-MnP Angle	31°	33.76° ± 5.77°
SN-MxP Angle	5	
Facial proportions	58.82	56.52% ± 2.3%

Table 2 - Archwire Sequencing Used In Treatment

Dates/visit	Upper Arch	Lower Arch
1ST- 3RD Visit	0.014 NiTi	0.014 NiTi
4TH-7TH Visit	0.016 NiTi	0.016 NiTi
8TH-10TH Visit	0.020 SS	0.020 SS
11TH-20TH Visit	0.019 x 0.025 SS	0.019 x 0.025 SS

Figure 5

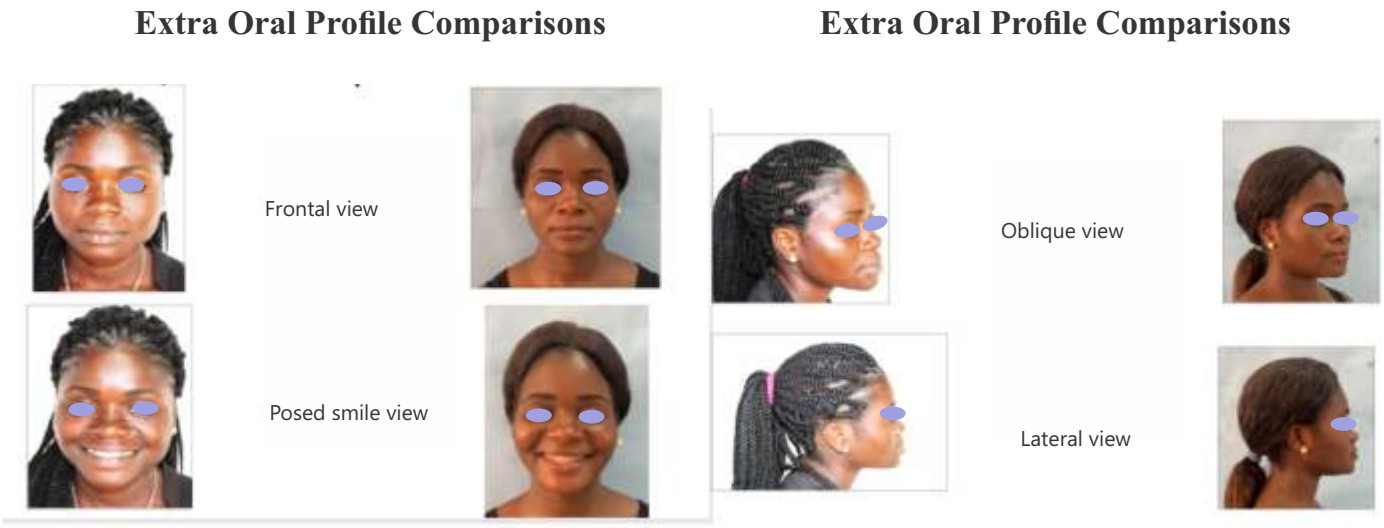


Figure 6

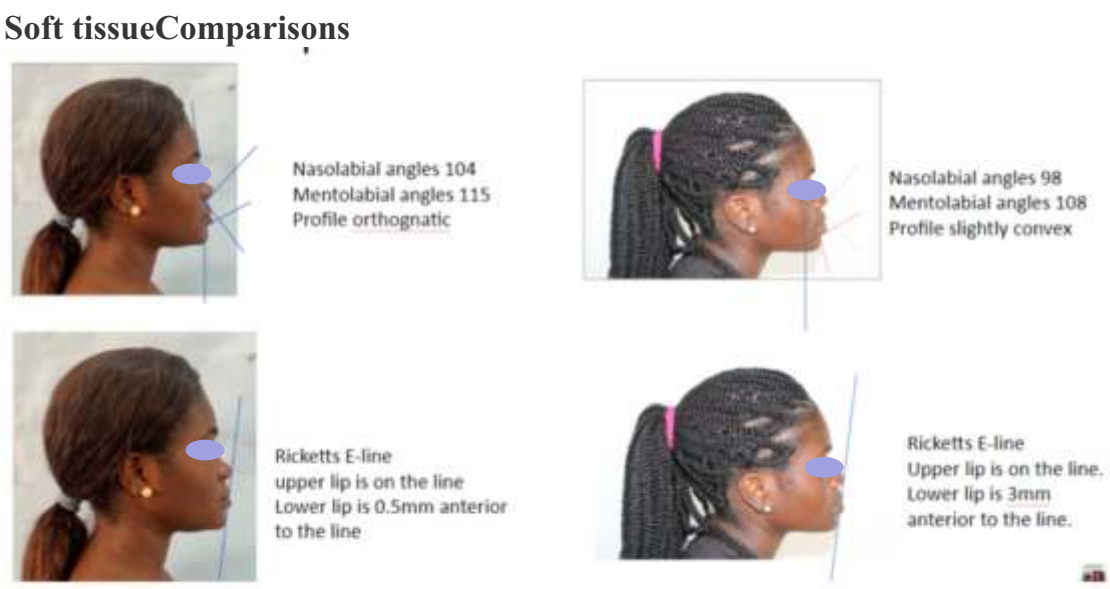
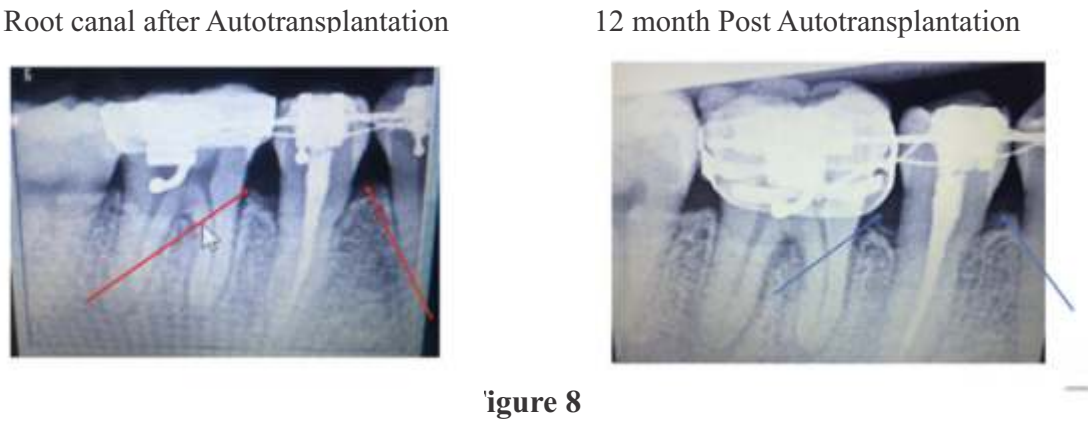


Figure 7



igure 8

Discussion

Space closure and its retention in an adult can be a difficult treatment to carry out when the occlusion seems stable. The desire for an aesthetic-looking smile has been the determining factor for most patients who seek orthodontic treatment for space closure.

The aetiology is varied, ranging from skeletal - where the maxilla or mandible may be large in relation to the teeth; dento-alveolar or dental - where the teeth sizes may be smaller in relation to the dental arches. Closing of spaces in an adult's teeth is therefore challenging and has a high occurrence of relapse.

Auto-transplantation is the surgical repositioning of a tooth within the same patient. It can be thought of as controlled avulsion and re-implantation of a tooth in a new, surgically-prepared socket. Auto-transplantation can be classified into three groups: (1) conventional transplantation, (2) intra-alveolar transplantation, and (3) intentional replantation.

Conventional transplantation (Figure 3) involves moving the teeth surgically from one site to another in the same individual. Auto-transplantation is the term usually used to describe the procedure. This procedure is indicated when there is a case of missing teeth with a hopeless prognosis, in a mouth where an appropriate donor tooth can be used without any negative effects from the loss of its position in the arch. Good candidate donor teeth are those with simple root form, at the optimal stage of root development, easy extraction, and in matching sizes for recipient sites.

Most documented auto-transplanted cases have been in children and adolescents, where there has been successful regeneration of the periodontal ligaments and the teeth had about one-third or half of their root length formed. The problems usually associated with auto-transplanted teeth are root resorption and ankylosis, particularly in adult patients, where the roots are completely formed.

However, in an adult patient, the occlusal forces from mastication and other forms of injuries, over time, lead to the obliteration of root canals, by laying down the reparative and secondary dentine. Ankylosis may not be seen as a deterrent to auto-plantation but the main concern will be the resorption of the roots. Ankylosis in this particular case study may be an advantage to anchorage control, to retract the anterior segment and close the spaces.

The treatment was performed with the straight wire technique MBT prescription(0.022x 0.028)

Leveling and alignment were carried out with a sequence of NiTi round wires. Stainless steel round wires with loops and rectangular posted archwires 0.019x 0.025(Table 2) were used in the active treatment phase. Retraction of the anterior segment was done with closed coil NiTi springs and the residual spaces were closed with a continuous elastic power chain.

There was improved aesthetics, intraorally and extra-orally (Figures 5, 6, &7), and 12 months post-auto-transplantation did not reveal any pathological loss of bone.

Conclusion

Space closure in the teeth of an adult patient can be challenging because of the high relapse rate. Dento alveolar proclination is a common occurrence in the afro-Caribbean population and is seen as a stable occlusion if not complicated by any other dental or skeletal aetiology.

Auto-transplantation is a viable treatment option in the management of compromised teeth among patients, once biological principles are adhered to. Treatment success is dependent on a good knowledge of the aetiology of the malocclusion, and the maintenance of a lifelong retention protocol.

Tooth auto-transplantation is a demanding surgical procedure. The possibility of complications and the success rate can be achieved by applying a methodology based on modern guidelines about tooth auto-transplantation. This will ensure that the transplanted teeth will remain functional for a significant period of time, offering another possible treatment plan with various advantages for the patient's oral health.

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Conflict of interest - Nil

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