

CLINICAL SECTION

Nance palatal arch: a cautionary tale

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The Nance palatal arch is considered a useful means of maintaining arch length and reinforcing anchorage control in the orthodontic patient. Difficulty with oral hygiene around the Nance arch and inflammation and bunching of the gingivae under the acrylic fitting surface are common problems associated with this appliance. We present a case of alveolar bone loss and gingival recession around the palatal root surfaces of the upper incisor teeth following use of Nance palatal arch. A possible cause for this is explored and management of the patient after the Nance arch was removed is discussed.

Key words: Nance palatal arch, orthodontics, fixed appliances, root surface exposure, periodontal surgery

Received 28th November 2008; accepted 27th June 2009

Introduction

The Nance palatal arch¹ is an appliance often used in orthodontic treatment to help maintain arch length and provide anchorage in the anterior-posterior and vertical planes.^{2–6} The appliance is cemented with bands placed on the molar teeth and a palatal acrylic button placed in the region of the rugae palatinae in the anterior part of the palate (Figure 1). The bands are connected to the button using a 0.9 mm round stainless steel wire. The acrylic button, which is up against the palatal mucosa, provides support derived from the hard palate. A Nance appliance has also been described that uses palatal attachments bonded to the teeth obviating the need for molar bands.⁷ Both versions are fixed in the patient's mouth which permits only the orthodontist to remove the appliance.

The Nance appliance is usually placed at the start of orthodontic treatment and can remain *in situ* for a significant part of the treatment period, often only being removed when the canines are retracted into class I. This may result in difficulty maintaining good oral hygiene under and around the appliance over such a long period of time, leading to inflammation of the oral mucosa beneath the acrylic button. To reduce this problem, Barwart and Richter described a removable Nance appliance that can be removed by the patient for cleaning and then reinserted.⁸ Despite this advantage over the fixed Nance, the use of a removable Nance has not become widespread, perhaps due to the issue of compliance.

Other problems include patient discomfort, appliance breakage and embedding of the acrylic button into the palatal soft tissues if space closure is attempted with the

Nance in place, either as the molars come forward or as the incisors are retracted. The consequence of the latter can result in bunching of the gingival tissues behind the upper incisors (Figure 2). More commonly it causes an imprint of the acrylic button on the palatal mucosa when the appliance is removed, which quickly resolves once the appliance has been removed and good oral hygiene instituted.

We describe a case where a Nance appliance embedded in the palatal tissues to the extent that it resulted in denudation of the palatal root surfaces of the maxillary incisors.

Case report

In December 2005, a 15-year-old male was referred by a Senior Dental Officer in the Community Dental Service to the Restorative Department at The Royal London Hospital for a periodontal opinion. The dentist was concerned about defects of the palatal gingival following removal of a Nance palatal arch.

The patient attended with his mother whose first language was not English, but spoke Urdu. Although the father spoke fluent English, he did not attend on the first visit. A history revealed that the patient attended his local community dental clinic for his general dental care. He had mild learning difficulties, although he had good understanding and communication skills.

A history revealed that the patient had been referred by his community dentist, some 16 months earlier, to the local district general hospital consultant orthodontist concerning his malocclusion. Subsequent examination of the records (Figure 3) showed that he presented with a Class II Division I incisor relationship on a moderate

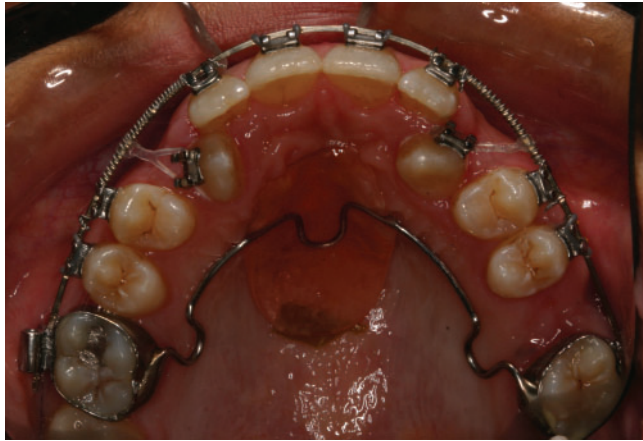


Figure 1 Nance palatal arch in place. Note food debris trapped around the posterior border of the acrylic button



Figure 2 Bunching of gingival behind the incisors and erythema after a Nance palatal arch was removed

Skeletal II base with decreased vertical proportions. The arches were reasonably well aligned, the molar relationship was a full unit Class II bilaterally and the overjet measured 9 mm with an increased and complete overbite. The upper first permanent molars were both hypoplastic and of limited long term prognosis. The lower first permanent molars had been extracted some years earlier and most of the space had closed with mesial movement and tipping of the lower second molars.

Radiographically, apart from the lower first molars, all other adult teeth were present. The guarded prognosis of the upper first molars was confirmed. No pre-treatment cephalogram was available for analysis.

After some initial concerns about his oral hygiene there was sufficient improvement to start orthodontic treatment. The treatment plan devised by the consultant orthodontist involved extraction of the upper first molars, placement of a Nance palatal arch and upper and lower fixed appliances.

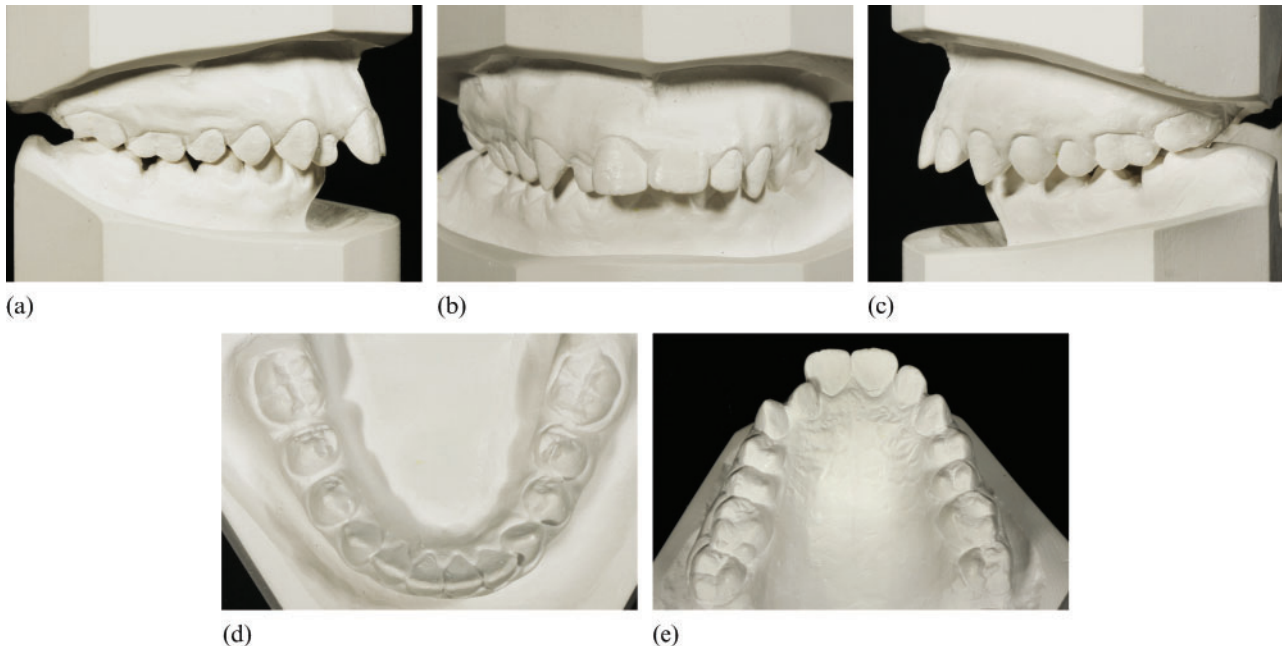


Figure 3 Study casts at the start of treatment showing previous loss of the lower first molars and a Class II Division I incisor relationship



Figure 4 Lateral cephalogram taken in March 2005, six months into treatment showing a significant overjet

Treatment was undertaken by a clinical assistant in the hospital setting and began around September 2004. At the start of treatment the patient recalled that he experienced pain from the appliances and in particular a lot of soreness around the Nance palatal arch. In March 2005, approximately six months into treatment, a lateral cephalogram was taken showing normal inclination of the upper incisors, but a significant overjet (Figure 4 and Table 1).

Approximately 14 months after treatment had commenced (November 2005) the patient made an emergency visit to the orthodontist due to a large swelling in

Table 1 Cephalometric analysis six months into treatment.

Variable	Value
SNA	82°
SNB	73°
ANB	9°
Upper incisor to maxillary plane angle	106°
Lower incisor to mandibular plane angle	88°
Interincisal angle	132°
Maxillary-mandibular planes angle	35°
Face height ratio	55%
Lower incisor to A-Pog line	-3 mm
Lower lip to Ricketts E plane	-1 mm

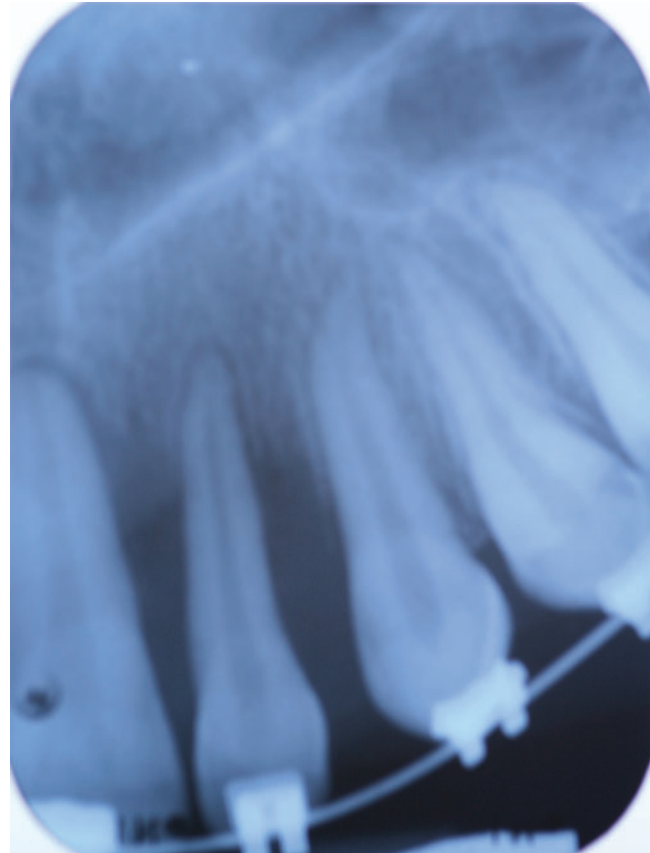


Figure 5 Periapical radiograph showing the degree of bone loss around the upper left central and lateral incisors

the anterior part of the palate. The Nance palatal arch was immediately removed. A periapical radiograph was taken and revealed significant alveolar bone loss around the upper left central and lateral incisors (Figure 5). The patient was prescribed a course of Amoxicillin and referred on to his community dentist for follow-up of the swelling.

The community dentist reviewed the patient two weeks later and although the swelling had resolved, a large defect in the palatal mucosa was present exposing bone and the roots of the upper left central and lateral incisors. Figure 6 shows the extent of the exposure after resolution of the swelling. Metronidazole was prescribed and root surface debridement under local anaesthetic was carried out around the affected teeth.

The community dentist was sufficiently concerned at the review appointment to refer the patient to the Restorative Department for a periodontal opinion at The Royal London Hospital where a joint consultation was held with a consultant orthodontist. It was decided to undertake periodontal mucogingival surgery to repair the two mid-palatal gingival recession defects associated



Figure 6 Extent of bone and root surface exposure around the upper right central and lateral incisors after the swelling had subsided

with the upper left central and lateral incisors and this was carried out in May 2006 under local anaesthetic. The defects were repaired with sliding pedicle flaps using a combination of double papilla and laterally positioned split-thickness palatal flaps as shown in Figure 7.

Six months after periodontal surgery the area had healed well and the patient was able to maintain good oral hygiene. Arrangements were made to have the remaining fixed appliances removed and the provision of a vacuum formed retainer. Further orthodontic treatment was offered to the patient involving surgical correction of the antero-posterior discrepancy and at the time of writing the patient was considering this.

Discussion

The Nance palatal arch has been used successfully for many decades. Unwanted effects of the acrylic button include difficulties in oral hygiene resulting in palatal erythema and embedding of the button causing bunching of the gingivae. While these effects are temporary and resolve quickly on removal of the arch, in our case report permanent damage was seen, which required abandonment of orthodontic treatment and periodontal surgical intervention.

At the start of treatment the patient presented with a moderately severe class II division 1 malocclusion. Treatment with a functional appliance was considered, but it was decided that the patient was too old. Orthodontic camouflage was therefore undertaken; however the loss of the compromised first permanent molars meant that anchorage reinforcement was essential, hence a Nance palatal arch was used. Despite this additional precaution for anchorage

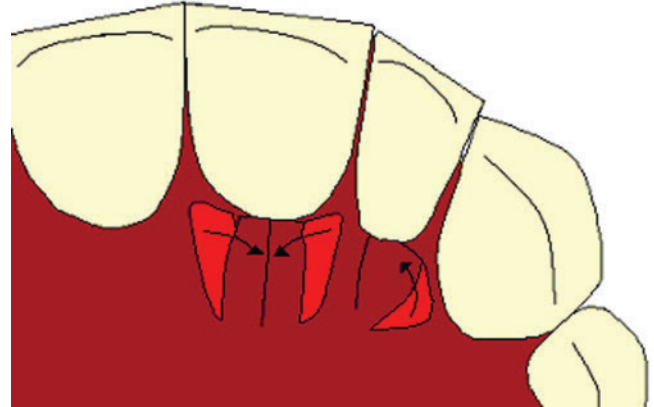


Figure 7 Diagrammatic representation of double papilla and laterally positioned split-thickness palatal flaps

management, the correction of such a significant overjet was probably optimistic. An alternative, orthognathic surgery, is now being discussed with the patient.

The patient experienced pain after fitting of the fixed appliances and this is not unusual since fixed appliance placement results in discomfort for the first few days. The patient experienced soreness around the palatal arch as soon as it was placed and this would be a cause for concern. It is possible that when the arch was cemented on to the maxillary second molars, the acrylic button may have embedded into the soft tissues rather than sitting passively on the palatal rugae. This pressure on the soft tissues and underlying bone could have resulted in resorption of these tissues and exposure of the root surfaces. In this case, space closure was undertaken and this will have contributed to the tissue damage. Vigilance should therefore be exercised if it is planned to carry out some space closure with the Nance palatal arch still in place.

As temporary anchorage devices increase in popularity, the use of palatal arches is likely to decline. Temporary anchorage devices were not in widespread use at the time of initial treatment planning and therefore may not have been considered as an alternative mode of anchorage control. The Tip-Edge appliance system may also have been an alternative option for such a case, allowing tipping movements in the early part of treatment to correct the Class II malocclusion.

While we provide our patients with detailed information about care and maintenance of fixed appliances and the unpleasant effects experienced immediately following placement of the appliances, we do not routinely advise patients to contact the clinician if pain is experienced around a Nance palatal arch. It is therefore important to give this warning to patients in which this form of anchorage is used.

Conclusion

This rare consequence of using a Nance palatal arch resulted in alveolar bone resorption and gingival recession on the palatal root surfaces of the incisor teeth. As well as standard instructions of oral hygiene and dealing with band cement failure, patients should be advised to contact the orthodontist if pain or discomfort is felt from the palatal button at any time during the course of the treatment. Ideally the Nance should be removed once the canines have been retracted into Class I. Vigilance should also be exercised if it is planned to carry out any additional space closure with the Nance palatal arch still in place. Finally, should resorption or gingival recession occur, the arch should be removed immediately and a prompt referral made to a restorative dentist.

Acknowledgements

The authors are grateful to Stephen Bagnall, Senior Orthodontic Technician, Ipswich Hospital for Figure 3 and Paul Ryan, Academic Clinical Fellow in Restorative

Dentistry, Barts and The London School of Medicine and Dentistry for Figure 7.

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