

Interdisciplinary management of a patient with a drug-induced gingival hyperplasia

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Abstract

Interdisciplinary treatment is becoming an ever-increasing part of modern-day orthodontic practice. This case report details the successful orthodontic-periodontal management of an epileptic patient with a significant drug-induced gingival hyperplasia. The problems that such patient's present are discussed before considering the specific orthodontic techniques employed. Recommendations are made for practitioners managing such cases.

Keywords: Gingivectomy, interdisciplinary management, orthodontics, phenytoin-induced gingival hyperplasia

Introduction

It is important that orthodontists have knowledge of the most common neurological conditions as some problems may manifest initially in the orthodontic chair.^[1] Epilepsy is a common symptom of an underlying neurological disorder. The seizure can take a variety of forms and the condition is considered to be active if a person has had a seizure within the last 2 years or is taking anti-epileptic medication.^[2] Brain damage due to injury, infection, birth trauma, or a cerebrovascular accident accounts for 25% of cases. The other 75% of cases have no identifiable cause but there is a familial trend. Epilepsy can develop in some genetic syndromes such as Down's syndrome^[3] or in Struge-Weber syndrome.^[4] The risk of developing epilepsy is 2–5% over a lifetime. The prevalence of active epilepsy is between 5 and 10 people per 1000 of the population.^[5] The condition is more common in men and the incidence is high in the first two decades of life, and then reduces before increasing after the age of 50 years as a result of cerebrovascular diseases.^[2] Both the condition and the medical management can affect oral health.

Phenytoin was once first choice in managing epilepsy in younger people but this has fallen out of favor because of its many side effects. These include nausea, mental confusion, acne, hirsutism, hepatitis, erythema multiforme, and gingival overgrowth.^[2] However, the orthodontist may still encounter patients taking phenytoin. Gingival enlargement secondary to drug therapy is wide spread and reports 8–100% of patient's taking this phenytoin have this overgrowth, with children

and adolescents being more susceptible than adults.^[6,7] Gingival overgrowth associated with phenytoin is the most widely known complication of anti-epileptic medication, with 50% of individuals being affected within 3 months of starting the drug.^[8] Gingival hyperplasia is greater in those with high plaque scores but there is also a genetic link.^[9] Gingivectomy is recommended to remove any hyperplastic tissue that interferes with appearance or function. For patients with recurrent hyperplasia, the patient's physician should be contacted to discuss alternative medication. Gingival hyperplasia resolves spontaneously within 1–6 months of phenytoin withdrawal.^[10] Prevention of oral gingival overgrowth or phenytoin-induced gingival hyperplasia and carefully planned interdisciplinary treatment is essential to the well being of patients with epilepsy.

This case report describes a case in which a 21-year-old male presented with significant gingival overgrowth following 14 years of phenytoin drug intake for epilepsy. He was being maintained on a long-term regimen of phenytoin and carbamazepine. His malocclusion was successfully managed with orthodontic treatment, gingivectomy, and improved oral hygiene.

Case Report

A 21-year-old male patient was referred to the department of orthodontics at A.M.E's Dental college, Hospital and Research centre, Raichur for an orthodontic consultation. He complained his teeth were retroclined, small, unsightly, and not straight. He was well motivated and keen for treatment.

History

His medical history indicated that he is an epileptic patient for which he was on medication taking phenytoin and carbamazepine since 14 years. He suffered from drug-induced gingival hyperplasia due to anti-epileptic medication but had no other side effects. Under the guidance of a consultant in the Department of periodontics, he had undergone a

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gingivectomy procedure, one year ago to reduce his gingival enlargement.

Extra-Oral Assessment

On frontal examination the patient presented with acceptable facial symmetry and balance and no tooth showing on smile. His dental centre lines were non-coincident with the mid-facial axis. On three-quarter and profile views, he had average vertical proportions, an average nasolabial angle, and his lips were competent at rest. [Figure 1a-b]

Intra-Oral Assessment

Intra-oral examination revealed a very poor standard of oral hygiene. Gingival hyperplasia affected the upper and lower anterior teeth labially, palatally, and lingually. Both upper and lower arches were crowded with anterior deepbite. The anterior deepbite was complete and no display of lower anterior teeth was appreciable in occlusion. The upper right

canine was in complete cross bite. The first and second premolars of the same side were buccally and palatally placed, respectively. In occlusion a class I relationship with 0 mm overjet and 100% complete overbite was found. The molar relationship was class I bilaterally. [Figures 2a-b]

Radiographs

Cephalometric analysis confirmed the clinical findings of a class I skeletal relationship with an ANB of 2.5° and a wits measurement of 1 mm, and average vertical proportions (B'jork sum 392° and lower face height proportion of 62%). The upper incisors were retroclined at 85° and lower incisors were retroclined at 84° [Figures 3a-b]

Index of Treatment Need^[11]

The dental health component (DHC) of the index of treatment need (IOTN) was 4c and the aesthetic component (AC) was 8.



Figure 1a: Pre-treatment extraoral frontal



Figure 1b: Pre-treatment extra oral profile



Figure 2a: Pre-treatment intra oral frontal



Figure 2b: Pre-treatment intraoral maxillary occlusal

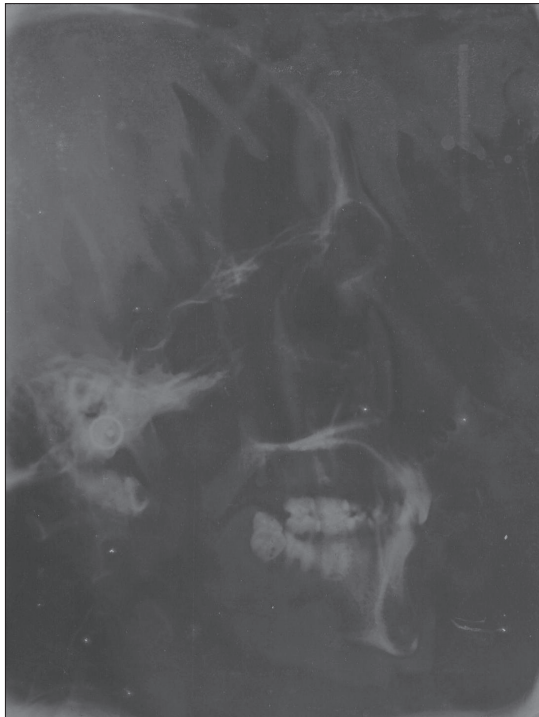


Figure 3a: Pre-treatment lateral cephalograph

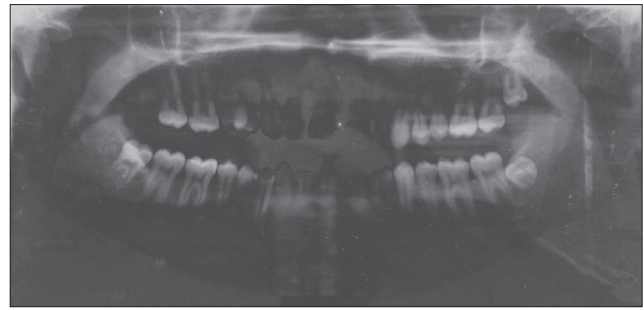


Figure 3b: Pre-treatment OPG

Treatment aims

These were as follows:

- Optimize the gingival health;
- Align maxillary and mandibular arches and resolve the crowding;
- Correction of 100% deepbite to normal or near normal overbite;
- Establish a class I incisor, molar, and canine relationship;
- Maintaining the optimal facial profile.

Treatment plan

The orthodontic treatment plan involved use of upper and lower fixed appliances on a non-extraction basis. The plan was therefore as follows:

- Oral hygiene instructions with dedicated dental education team;
- Bond the upper and lower arches with MBT (GAC Company) pre-adjusted edgewise appliances (0.022 × 0.028-inch slot);
- Align and level the arches and working up to 0.019 × 0.025-inch stainless steel arch wires;
- Reduce the overbite while correcting the centrelines;
- Detail and finish the occlusion;
- Debond and retain.

Treatment progress

Oral hygiene was already of a good standard but given the degree of hyperplasia, oral hygiene instructions and dietary advice was reinforced on a dedicated dental health education

clinic. His plaque index scores were reduced from 13% to 1.8%. Informed consent was gained including additional warnings of the possible need to abandon treatment if the hyperplasia worsened significantly; the possibility of a residual overbite post treatment and the requirement for long term retention.

The upper and lower arches were bonded with MBT (GAC Company) pre-adjusted edgewise bracket system. Maxillary right canine was not bracketed initially. Laceback mechanics were placed in the upper right and left quadrants, and 0.016" heat activated NiTi arch wires were used to begin the leveling and aligning of the arches. The lower arch was programmed to a customized and coordinated 0.0019" × 0.0025"-inch stainless steel arch wires. In the maxillary arch, a fixed anterior bite plate was given to align the in standing and rotated 15. With the fixed anterior bite plate, 15 was bracketed and an auxiliary 0.014"-inch NiTi arch wire was then placed for the alignment of the same.

The oral hygiene remained at an excellent standard, but the gingival hyperplasia was steadily worsening. This was especially evident in the labial segment and on removing the arch wires, indentations were noted in these areas. On replacing the arch wires blanching of the gingivae was apparent as the arch wire pressed on the gingivae in the anterior region of the teeth [Figures 4a-d]. As the treatment progressed to 0.0019" × 0.0025"-inch stainless steel arch wires, torque expression was noticed with the teeth appearance on smile. The upper arch seated to the lower arch with the braided 0.0019" × 0.0025"-inch stainless steel arch wires and box elastics. These arches were debonded and upper and lower fixed retainers were provided. A removable anterior bite plane was given for maintenance of the deep bite correction. Treatment was completed over a period of 20 months and a good esthetic result was achieved [Figure 5a-b and 6a-b]. As the gingival hyperplasia had almost fully resolved and the patient was very happy with the outcome, it was not necessary to consider further gingival surgery.

Discussion

This case report documents a successfully treated orthodontic



Figure 4a: Mid treatment intra oral right lateral

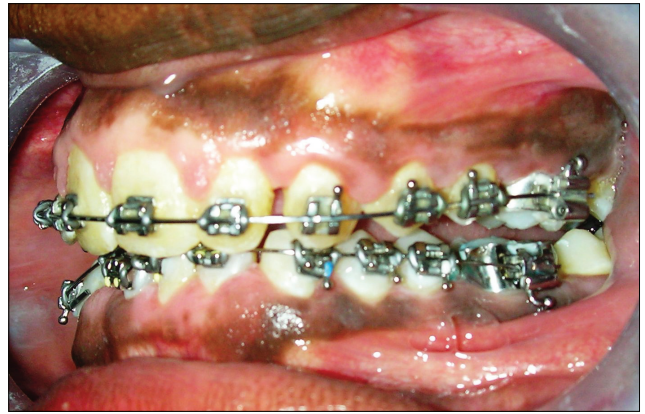


Figure 4b: Mid treatment intra oral left lateral

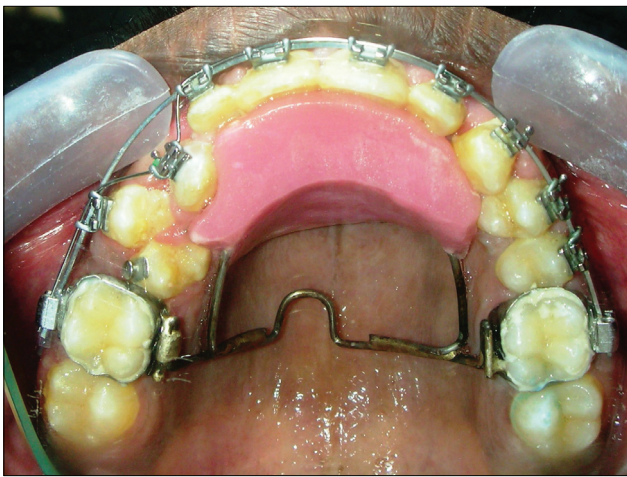


Figure 4c: Midtreatment intraoral maxillary occlusal



Figure 4d: Midtreatment intraoral mandibular Occlusal



Figure 5a: Post-treatment extraoral frontal



Figure 5b: Post-treatment extra oral profile

case in which the patient had significant gingival hyperplasia. Gingival overgrowth associated with phenytoin is the most widely known complication of anti-epileptic medication, with

50% of individuals being affected within 3 months of starting the drug.^[8] Treatment was aimed at preventing worsening of the gingival hyperplasia as well as minimizing the effect



Figure 6a: Post-treatment intra oral right lateral



Figure 6b: Post-treatment intra oral left lateral

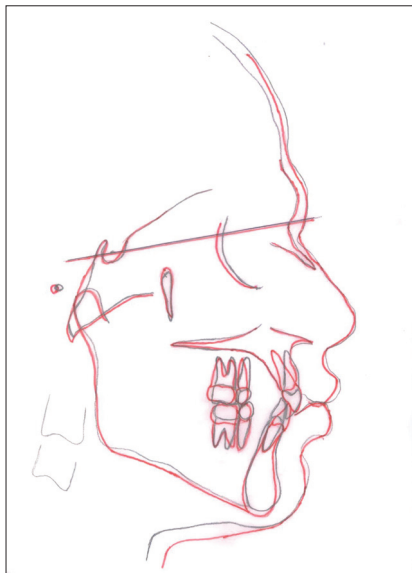


Figure 7: Digitized superimposition

Table 1: Pre- and post-treatment superimposition values

Skeletal	Parameter	Normal	Pre treatment	Post treatment
	SNA	82°	82°	82°
	SNB	80°	79.5°	79.5°
	ANB	2°	2.5°	2.5°
	FMA	25°	21°	21.5°
	B'jork Sum	396°	391.5°	392°
Dental	Overjet	2 mm	0 mm	2 mm
	Overbite	2 mm	100% Deep Bite	2 mm
	U ₁ -SN	102°	85°	101°
	IMPA	90°	84°	92°
	Interincisal Angle	131°	153°	130°
Soft tissue	Lip Sep	0 mm	0 mm	0 mm
	Exp U ₁	2 mm	0 mm	2 mm
	NLA	102°	97°	100°
	L _s -E	-4 mm	-0.5 mm	-2 mm
	Li-E	-2 mm	1 mm	0 mm

of hyperplasia during treatment. A rigorous oral hygiene regimen was implemented before treatment commenced and this was reinforced throughout with regular dental health educator visits and plaque scores.

Inflammation has been shown to play a prime role in this condition^[9] with the magnitude of adverse gingival changes being reduced when patients enroll on an oral hygiene programme.^[10] This is supported by Bryan and coworkers^[12] who reported that poor oral hygiene exacerbates drug-induced gingival hyperplasia. It is worth noting, however, that while stringent oral hygiene measures may reduce the degree of hyperplasia,^[13] they do not inhibit its development.^[13,14]

A non-extraction treatment plan was used for this patient.

He had a deep bite, severe crowding, and cross bite. The treatment plan aimed for an overall improvement in occlusion and esthetics. An important factor in the management of this patient was having a well-organized treatment protocol with liaison between specialties. Prior to referral to the Orthodontic Department, this patient underwent full mouth gingivectomy. This is, however, only of temporary benefit^[2] and indeed the overgrowth recurred by the time the patient was initially assessed. [Figure 2a-b] Following completion of orthodontic treatment, input was also received from periodontics colleagues in addressing maintenance of the oral hygiene and periodontal condition. A superimposition [Figure 7] of the pre- and post-treatment cephalographs show an improvement in the dento-alveolar parameters and maintenance of the soft tissue parameters [Table 1].

Table 2: Orthodontic key technique to successful management of patients with gingival hyperplasia

Oral Hygiene	Dedicated dental health education team Regular reinforcement of oral hygiene instructions Support of dental hygienist
Liaison	Liaise with general medical practitioner/hospital physician Seek assistance from surgical periodontal colleagues
Treatment Plan	Simplify aims and avoid extractions where possible
Appliance design	Use small, low profile brackets Remove excess composite from around the brackets
Treatment Mechanics	Avoid space closing arch wire loops and springs
Retention Regime	Use Essix retainers relieved around gingival margins Avoid bonded retainers

Conclusion

A good occlusal and esthetic result was achieved for this patient. This was achieved by employing an orthodontic treatment protocol that was tailored specifically to this patient's needs and liaison with other specialties. During the treatment, oral hygiene was continually reinforced and treatment mechanics adjusted to simplify oral hygiene.

The authors recommend early consultation with these patients' physicians to explore the possibility of adjustment of medication to aid control of the gingival overgrowth. Further assistance may be sought from oral surgery and/or periodontology colleagues to perform the gingival recontouring procedures.

This case report highlights that even though patients with drug-induced gingival overgrowth present difficult

challenges for orthodontic treatment, their management can be successful if the practitioner is aware of the causes of over growth, its control and its implications on treatment mechanics. Techniques suggested within this report can aid in orthodontic management [Table 2].

References

- Hutchinson S, Clark S. Multiple sclerosis presenting to the dental practitioner: A report of two cases. *Dent Update* 2001;28:516-7.
- Fiske J, Boyle C. Epilepsy and oral care. *Dent Update* 2002;29:148-56.
- Fiske J, Shafik HH. Downs syndrome and oral care. *Dent Update* 2001;28:148-56.
- Gorlin RJ, Cohen Jr MM, Hennekam RC. *Syndromes of the Head and Neck*. 4th ed. Oxford: Oxford University Press; 2001.
- Sander JW. The epidemiology of epilepsy revisited. *Curr Opin Neurol* 2003;16:165-70.
- Wright G, Welburry RR, Hosy MT. Cyclosporin- induced gingival overgrowth in children. *Int J Pediatr Dent* 2005;15:403-11.
- Proctor R, Kumar N, Stein A, Moles D, Porter S. Oral and dental aspects of chronic renal failure. *J Dent Res* 2005;84:199-208.
- Seymour RA, Thomason JM, Ellis JS. The pathogenesis of drug-induced gingival overgrowth. *J Clin Periodontol* 1996;23:165-75.
- Hassel TM, Burtner AP, McNeal D, Smith RG. Oral problems and genetic aspects of individuals with epilepsy. *Periodontol* 2000 1994;6:68-78.
- Sanders B, Weddell JA, Dodge NN. Managing patients who have seizure disorders: Dental and medical issues. *J Am Dent Assoc* 1995;126:1641-7.
- Brook PH, Shaw WC. The development of an index for orthodontic treatment priority. *Eur J Orthod* 1989;11:309-32.
- Bryan RB, Sullivan SM. Management of dental patients with seizure disorders. *Dent Clin North Am* 2006;50:607-23
- Chabria D, Weintraub RG, Kilpatrick NM. Mechanism and management of gingival overgrowth in paediatric transplant recipients: A review. *Int J Paediatr Dent* 2003;13:220-9.
- Seymour RA, Smith DG. The effect of a plaque control programme on the incidence and severity of cyclosporine-induced gingival changes. *J Clin periodontol* 1991;18:107-10.

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