

# Gingival overgrowth: Part 2: management strategies

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## In brief

Suggests that gingival overgrowth management requires a structured approach including preventative, non-surgical cause-related therapy and in some cases surgical interventions.

Highlights that failure of cause-related treatment to eliminate aesthetic, functional and speech related complications of gingival overgrowth is likely to indicate surgical intervention.

Demonstrates that surgical techniques may include a gingivectomy or apically repositioned flap.

Suggests that a variety of techniques may be used to perform a gingivectomy including scalpel, electrosurgery and laser methods.

The effective and predictable management of gingival overgrowth requires correct diagnosis and consideration of aetiological factors, as discussed in Part 1 (*BDJ* 2017; 222: 85–91). Initial management should involve cause-related therapy, which may resolve or reduce the lesion. If functional, aesthetic and maintenance complications persist following this phase; further treatment may be required in the form of surgery. This paper discusses management strategies, including management of aetiological factors and surgical techniques.

## Complications

Gingival overgrowth can affect function, resulting in difficulties with speech and mastication. More severe forms of fibrous overgrowth, such as hereditary gingival fibromatosis may result in a diastema, tooth malposition, retention of primary teeth, delayed eruption, malocclusions, and prominent and incompetent lips.<sup>1</sup>

Altered gingival anatomy is likely to restrict access for plaque control, leaving individuals predisposed to periodontal disease and halitosis.<sup>1</sup> This coupled with poor aesthetics, may have a detrimental psychological impact on the patient.

Where possible, early intervention is likely to limit these consequences. As described in paper 1 of this series, multidisciplinary input or onward referral on an urgent basis may be required. All patients will, however, benefit from basic dental advice, even if the decision is made to delay professional intervention until

diagnosis is confirmed, for example in cases of suspected malignancy.

## Management strategies

Management of gingival overgrowth can be described in two phases. The first, cause-related therapy, involves attempts to modify aetiological factors. This is followed by a period of review, after which a second surgical phase may be considered if the condition persists.

### Phase 1: Cause-related therapy

#### Local factors

##### *Oral hygiene instruction and non-surgical periodontal therapy*

All patients should undergo oral health education in order to tailor a preventative regime to optimise plaque control and reduce plaque-related gingival inflammation.

The correct use of a manual or electric toothbrush, with mechanical interdental techniques is important to effectively reduce the plaque presence.<sup>2,3</sup> Toothpastes aid plaque removal and some contain pharmacological agents (ie triclosan) to reduce bacterial load.<sup>4</sup> Many patients with impaired ability to perform oral hygiene measures will benefit from additional chemical measures such as 0.2% chlorhexidine gel or mouthwash.<sup>2,3</sup>

Basic periodontal examination (BPE) may not be reliable in patients with gingival overgrowth due to 'false pocketing'. Removal of hard calculus deposits and disruption of the plaque biofilm by scaling using ultrasonic or hand instruments is also beneficial in order to create an environment to promote optimal oral hygiene. Where there is evidence of attachment loss due to periodontitis, root surface debridement is indicated. Where there is advanced periodontitis, teeth of hopeless prognosis should be extracted (Figs 1a–e).

#### *Adjustment of plaque retentive factors*

Intraoral features that increase the challenge of maintaining optimal plaque control should be modified or eliminated where possible. This may include the replacement of over-contoured restorations and the modification of prostheses or appliances to reduce gingival coverage.

Where it is not possible to eliminate plaque retentive factors, detailed oral hygiene instruction should be provided to assist the patient in cleaning around the prostheses. Additional supportive care may be required with an increased frequency of recall interval for professional debridement.<sup>5</sup>

Some patients will not be able to achieve an optimal level of oral hygiene; however, providing intense oral hygiene instruction and

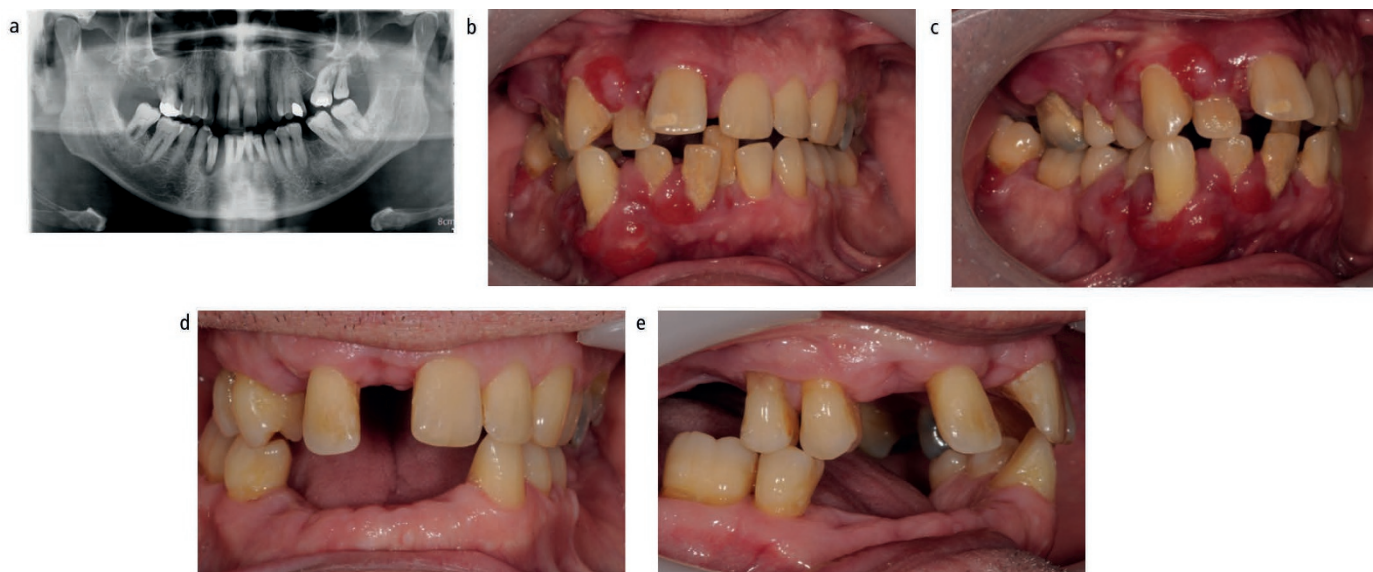
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**Fig. 1 (a–e)** This 60-year-old patient presented with gingival overgrowth and severe chronic periodontal disease including a peri-endodontic lesion 43, 13. The patient was also prescribed amlodipine and had type 2 diabetes. With supportive oral hygiene advice, selective extractions and non-surgical treatment the overgrowth is eliminated and periodontal disease stabilised



**Fig. 2 (a)** This 35-year-old patient with learning difficulties and prescribed amlodipine presented with poor oral hygiene and associated long standing gingival overgrowth; **(b)** Upper arch treated with surgical gingivectomy 7 days post-operative; **(c)** Lower arch treated with NSPT alone at 3/12 review; **(d)** 10 week periodontal review showing improvement in overgrowth but persistent poor oral hygiene and associated gingival inflammation

non-surgical periodontal treatment will still benefit their overall gingival and periodontal health. Figure 2 is a patient with learning difficulties with drug influenced gingival overgrowth and poor oral hygiene. In this case, oral hygiene advice, full mouth non-surgical periodontal treatment and a gingivectomy in the maxilla has reduced the gingival overgrowth.

Patients with existing gingival overgrowth who require orthodontic treatment pose a clinical challenge and may benefit from a multidisciplinary approach. Fixed or removable

appliances are likely to hinder plaque control which may exacerbate any existing periodontal problems.<sup>5,6</sup> It is therefore important to optimise periodontal condition prior to orthodontics and provide additional supportive care as needed for the duration of treatment.

#### Denture follow-up

Regular dental attendance, particularly after immediate denture provision, will allow assessment and intervention to reduce the risk of denture-induced fibrous inflammatory

hyperplasia (FIH). To prevent such lesions it has been suggested that complete dentures are replaced at five year intervals.<sup>7</sup>

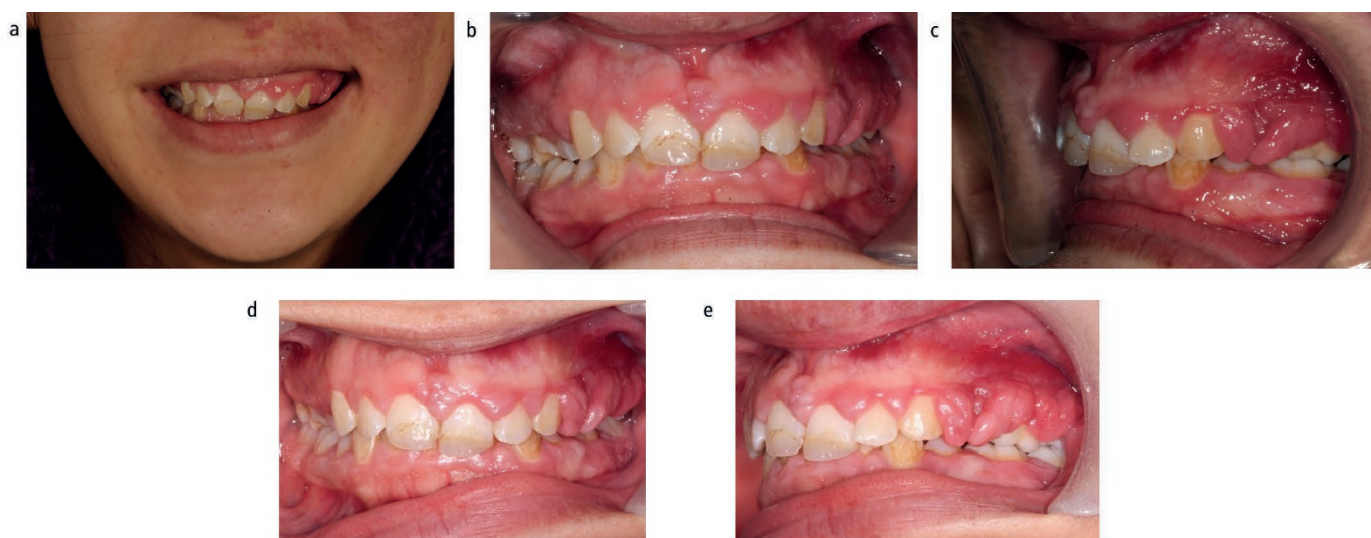
Where an area of hyperplasia has developed, initial conservative management involves removing the irritant. This may mean polishing or adjusting the denture flange so that it is well clear of the lesion. Ultimately, the patient is likely to require new dentures, however; it is advantageous to delay this until there has been some resolution of the area. This will aid impression taking and ensure that the prosthesis can be optimally extended.

#### Abscesses

Immediate management of fluctuant swellings may include incision and drainage, with adjunctive antibiotics if there is evidence of systemic spread of infection. Adjacent teeth should be assessed to determine aetiology and the most appropriate long-term treatment option. This may include extraction or root canal treatment where there is endodontic involvement, or in cases where aetiology is periodontal, non-surgical therapy and subgingival debridement as described previously.

#### Systemic factors

Where gingival overgrowth is related to an underlying systemic condition, medical management of this will often improve gingival manifestations, reducing the need for intervention from the dental team. This is discussed in part I. Systemic states such as pregnancy and puberty, are transient and by ensuring control



**Fig. 3 (a–c)** 21-year-old patient diagnosed Sturge-Weber Syndrome affecting the left side and is associated with localised gingival enlargement of the maxillary gingival tissues on this side. Caution must be taken prior to any surgical intervention due to a significant bleeding risk; **(d–e)** Following oral hygiene advice and NSPT there has been some improvement to the general gingival health, however, no resolution of the gingival enlargement

of local factors as detailed above, spontaneous resolution may occur with time. Dietary advice or supplements may be necessary to treat Vitamin C deficiency.

Granulomatous diseases require specialist medical input and if suspected, referral should be made urgently. Conditions such as neurofibromatosis may require surgical removal of gingival tissue affecting form or function and referral to maxillofacial teams may be indicated. Careful consideration of the nature of the enlarged tissue must be considered.

Figure 3 shows a localised area of gingival overgrowth in a patient diagnosed with Sturge-Weber syndrome. When considering resection of this tissue, there is increased risk of bleeding due to vascular malformations and increased capillary network. Further investigation such as MRI may be required to evaluate the vasculature of the enlarged tissue prior to surgical resection. Additional precautions such as tranexamic acid, dressing plates or involvement of oral and maxillofacial surgery colleagues may be advisable.

In cases of oral manifestations of malignancy, such as squamous cell carcinoma or lymphoma, referral to oral and maxillofacial surgery specialists is indicated for management.

#### **Drug-related gingival overgrowth**

Where overgrowth is related to medication, some, if not complete resolution is likely to occur with improved plaque control and non-surgical debridement (Figures 2 and 4).

Consideration may be given to substituting the medication implicated for an alternative drug or reducing the dose. Generally, this is a medical decision and should be made by the patient's GMP or specialists involved in their care.<sup>8</sup> Although medication change may be ideal in dental terms, priority should be given to the patient's medical health. For example, given that the use of phenytoin in epilepsy is limited to those with long-term successful seizure control or in cases of intractable disease,<sup>9</sup> proposals for change are likely to be met with resistance.

#### **Leukaemia**

Where gingival overgrowth is a symptom of leukaemia, pronounced enlargement usually resolves following the onset of chemotherapy, in conjunction with adjunctive oral hygiene and prophylactic measures.<sup>10</sup> However, patients often struggle with conventional tooth brushing as the gingivae may be painful and bleed profusely. An effective strategy is to use a combination of mechanical and chemical plaque control.<sup>11</sup> Alternative brushing methods include use of a soft-bristled toothbrush or cotton wool rolls (soaked in 0.2% chlorhexidine) and a careful technique may be implemented to minimise haemorrhaging.

Liaison with the wider medical team is important prior to carrying out any dental treatment for these patients. They are often neutropenic and thrombocytopenic, and this can be further exacerbated by chemotherapy treatments. If platelet count is less than 50 x

$10^9/L$ , a platelet transfusion may be required to reduce the risk of haemorrhage depending on the degree of inflammation and intervention planned.<sup>12</sup> Post-operatively, local haemostatic measures, tranexamic acid and further transfusion may be required.<sup>12</sup> Similarly, if the neutrophil count is less than  $1.0 \times 10^9/L$  the oncologist should be contacted for advice regarding antibiotic prophylaxis due to the high risk of infection.<sup>12</sup>

## **Phase 2: Surgical management**

### **Indications**

Where cause-related therapy has failed to bring adequate resolution of gingival overgrowth and interference with speech, function or aesthetics persists, surgery may be indicated. This may aim to resect overgrown tissue (gingivectomy) (Fig. 5), recontour the gingivae (gingivoplasty) or both. Removal of tissue also facilitates histological examination and diagnosis.

The need for a surgical phase will vary according to disease aetiology and severity at presentation. For example, in cases of hereditary gingival fibromatosis where primary aetiology is genetic and cannot be modified, surgical management is commonly required. Severe cases are also more likely to progress to surgery as in these cases the significant changes to gingival contour make it much more challenging to achieve the level of plaque control required for resolution. On occasion, surgery must be carried out without the patient achieving optimal oral hygiene, as without



**Fig. 4** (a–b) Patient with ciclosporin-related gingival overgrowth following NSPT. Note good oral hygiene and lack of inflammation, however, persistent gingival overgrowth. c) A Blake knife is used to resect the enlarged tissue; (d–e) Immediately following gingivectomy; (f–g) A Coe-Pak dressing is placed and locked into the undercuts to secure in place; (h–i) 7 days post-operative review

gross resection of the soft tissues plaque control will be very challenging. This can be additionally complicated by social factors or other health concerns such as manual dexterity or learning difficulties (Fig. 2).

Even if complete resolution is unlikely without surgery, cause-related therapy should be attempted in the first instance to reduce inflammation and risk of recurrence post-operatively (Fig. 4). Inflammation may lead to increased haemorrhaging at the time of surgery, compromising visibility. Additionally, inflamed tissues are more friable and difficult to handle; this may lead to increased surgical trauma, delayed healing and scarring.

#### Medical considerations

Liaison with medical colleagues prior to surgery is strongly recommended where patients have significant medical co-morbidities. The risks and benefits of the procedure, which is likely to be elective, should be assessed and discussed with the patient.

Immunosuppressant and steroid medications, often prescribed following organ transplantation or for connective tissue diseases increase susceptibility to secondary infection. Additional steroid cover may also be required if prednisolone dose is above 15mg per day. Below this, no cover is recommended<sup>12</sup> but regular blood pressure monitoring is advised.<sup>13</sup>

#### Techniques

##### Excisional biopsy

Removal of localised intraoral lesions may be necessary for functional or aesthetic reasons or to allow histopathological examination. These lesions include epulides, pyogenic granulomas and traumatic fibrous lesions. Excisional biopsy is indicated where a lesion is almost certainly benign and can be performed using scalpel, laser or electrosurgery in order to remove the lesion intact. Biopsy is performed by removal of the lesion entirely and primary closure using sutures where possible, although gingival tissues may not permit this. Laser and electrosurgery

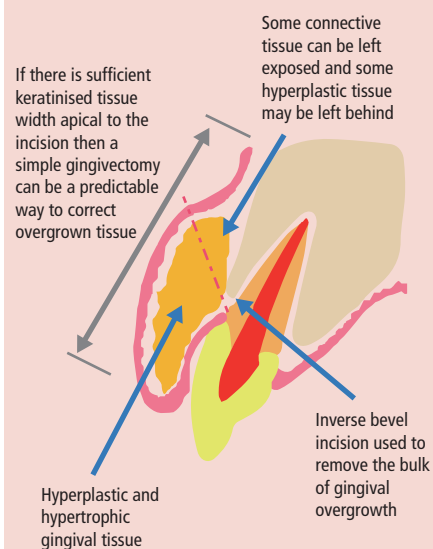
will achieve haemostasis whereas in scalpel excision, a holding suture may be necessary to apply pressure and stop haemorrhage.

##### Scalpel gingivectomy

Scalpel gingivectomy is the current gold standard method for correcting gingival overgrowth (Figs 4 and 6).<sup>14</sup> This is a resective technique and therefore it is most appropriate where there is minimal attachment loss, false pocketing and at least 3 mm height of keratinised mucosa apical to the base of these pockets.<sup>15</sup> Where overgrowth is generalised, it may be best to limit the procedure to six teeth or perform it by sextant to minimise post-operative discomfort.<sup>15</sup>

After adequate anaesthesia, the base of the false pocket is marked by puncturing the outer surface to produce a bleeding spot.<sup>15</sup> These bleeding spots guide the level of the initial external bevel incision, which provides a thin and distinct bevel (Figs 4c and 6b).<sup>8,16</sup> Interproximal tissue is released with a secondary incision.<sup>15,16</sup> The incised tissues are removed with a scaler or

Fig. 5 Gingivectomy procedure



curette. Final gingivoplasty modifications can be performed with tissue nippers/surgical scissors and a diamond bur in a high-speed handpiece.<sup>15,16</sup> In addition, electrosurgery can be useful for tissue contouring and haemorrhage control (Fig. 6c).

At the end of the procedure the surgical wound should be dressed with a pressure dressing for 10–14 days (Coe-Pak™ – GC) (Figs 4f & g).<sup>15,16</sup> The patient should be given advice regarding post-operative oral care and over-the-counter analgesia. Ideally, non-steroidal anti-inflammatory medications should be avoided in the first 24 hours, as they increase the bleeding tendency.<sup>17</sup>

### Laser gingivectomy

Types of laser indicated for removal of gingival soft tissues include CO<sub>2</sub>, diode and Nd:YAG with subtle differences in the properties of each. Lasers have been reported to offer some surgical advantages including sterilisation of the surgical field and reduced haemorrhaging, allowing for improved visibility and greater accuracy of incision.<sup>8</sup> The coagulated tissue layer promotes healing and may avoid the need for a dressing.<sup>8</sup> The use of a laser over scalpel gingivectomy may improve healing times with faster epithelisation.<sup>18</sup> Mavrogiannis *et al.* suggested lasers were associated with slightly less post-operative pain and higher patient tolerance of the procedure,<sup>14</sup> which may be a result of the perception that it is a less invasive option.

There is little quality evidence comparing the use of a laser over standard scalpel gingivectomy. Lasers may be particularly indicated in certain cases where tissues are friable and



Fig. 6 a) This patient presented phenytoin related gingival overgrowth. b) A Blake knife is used to remove the bulk of tissue. c) Electrosurgery is used to refine and provide haemostasis. d) Immediately post-operative and prior to a Coe-Pak dressing. e) 7 day post-operative. f) 3 months post-operative with stable and matured gingival architecture.

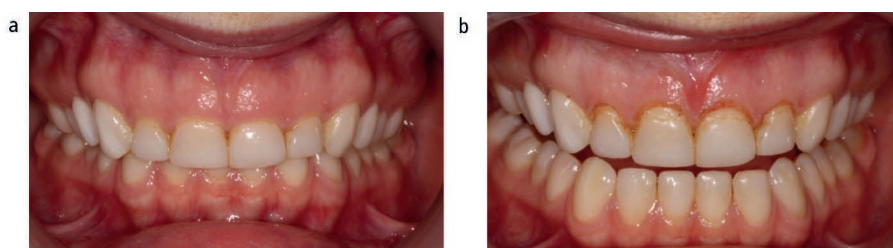


Fig. 7 a) Patient with altered passive eruption associated with amelogenesis imperfecta restored with composite veneers and undesirable tooth width to height ratio of the maxillary incisors. b) Immediately post minimal gingivectomy with electrocautery to increase the clinical crown height

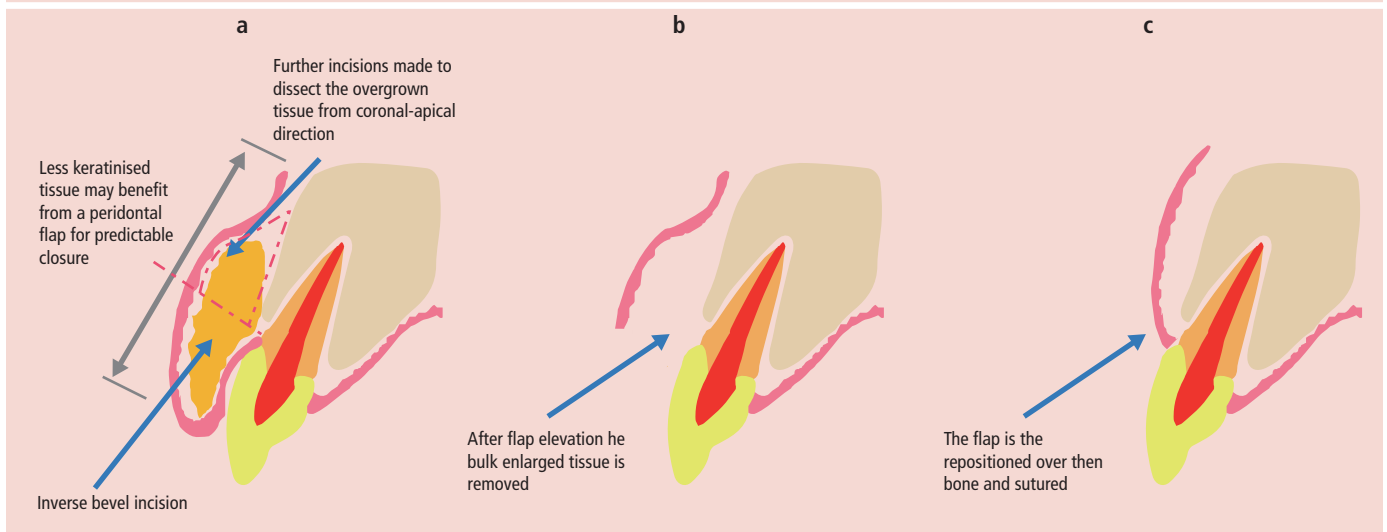
vascular; otherwise, they are associated with considerable expense, in terms of capital cost, training and maintenance of equipment.<sup>14</sup>

### Electrosurgery gingivectomy

Electrosurgery can also be used to perform gingivectomy and has similar advantages to lasers in terms of ability to achieve haemostasis. (Fig. 7).<sup>8</sup> It may also be advantageous over a scalpel gingivectomy where there are

practical challenges, such as use in children, as it is a quicker procedure.<sup>8</sup> Electrosurgery can be used carefully to make subtle changes to the gingival marginal level where there are areas of gingival excess (Fig. 7). However, this technique is limited to within 3 mm of the base of the pocket in order not to encroach on the biological width. Where there is no false pocketing a formal crown lengthening procedure would then be required with bone removal.

Fig. 8 (a-c) apically positioned flap and debulking of overgrown tissue



Electrosurgery is contra-indicated in patients with a poorly shielded pacemaker.<sup>19</sup> The surgery results in an unpleasant odour and therefore, high-volume aspiration should be used. When removing gingival tissue care must be taken to avoid heat generation by keeping the tip moving during the cutting phase, whilst avoiding contact with the tooth or bone.<sup>19</sup> Poor techniques may result in gingival recession, bony necrosis, furcation exposure and tooth mobility.<sup>8,19</sup> Similarly metal instruments should not be contacted by a laser or electrosurgery tip as distant tissues may be damaged.<sup>19</sup>

#### Periodontal flap surgery

Where there is true attachment loss and false pocketing, an apically positioned flap with simultaneous debulking of the overgrown tissue may be indicated. This procedure allows for greater preservation of keratinised gingivae<sup>15</sup> and greater reduction of interproximal tissue than a gingivectomy. It also allows for assessment of the underlying bony morphology and removal of granulation tissue lining the periodontal pocket.<sup>14</sup>

As per the gingivectomy technique, pocketing is first assessed with a periodontal probe. An initial scalloped reverse bevel incision is made within the gingival tissue at least 3 mm above the muco-gingival junction (Fig. 8a).<sup>15,16</sup> This maintains keratinised gingival tissue and creates surgically formed papillae.<sup>15,16</sup> Two further incisions are carried out to thin the gingival tissues and allow a full thickness flap to be elevated (Fig. 8a).<sup>15,16</sup> Curettes are used to remove tissue tags, ensuring the root surfaces are thoroughly debrided (Fig. 8c).<sup>15,16</sup> Osseous recontouring

may be carried out where there are infra-bony defects using rotary instruments or piezosurgery equipment.<sup>15,16</sup>

Repositioning of the flap is guided by the newly created papillae and closure is best achieved with monofilament sutures, which will minimise inflammation of the tissues in the healing phase. Firm pressure should then be applied for ten minutes with damp gauze.<sup>15,16</sup> A pressure pack (Coe-Pak™) may be used if there is mobility of the tissues to ensure that the intended position of the flap is maintained during the healing phase. This is removed along with the sutures approximately seven days post-operatively (Fig. 4h & 4i and 6e).<sup>15,16</sup>

Mavrogiannis *et al.* reported that patients experienced more post-operative pain following periodontal flap surgery when compared with gingivectomy, despite the fact there is no large unprotected wound. It has been suggested that it may be due to elevation of a mucoperiosteal flap and subsequent suturing.<sup>14</sup>

#### Recurrence

Management strategies may be successful in resolving or reducing gingival overgrowth however; if aetiological factors persist there will often be recurrence. As discussed it is not always possible to eliminate all factors and therefore the risk of recurrence may be different depending on aetiology.

For example, in cases of drug induced overgrowth where medication cannot be changed, recurrence has been reported in 34% of cases.<sup>8</sup> Piloni *et al.* suggest that a periodontal flap will sustain reduced periodontal pocketing for

longer periods over a gingivectomy in DIGO.<sup>20</sup> In hereditary gingival hyperplasia it is not possible to change the genetic predisposition so recurrence is highly likely.<sup>1</sup>

#### Surgical method

The surgical method does not appear to have a significant long-term effect on recurrence rate. Mavrogiannis *et al.* reported that in a split mouth study, laser gingivectomy reduced recurrence in the first three months post-surgery, when compared to scalpel gingivectomy and periodontal flap procedures.<sup>14</sup> This is likely to be related to the reduction in collagen production seen in connective tissue fibroblasts as a direct result of the laser.<sup>14</sup>

#### Supportive care

Preventative and non-surgical maintenance is paramount for long-term stability.<sup>8</sup> Initial follow-up at approximately three-monthly intervals is important to reinforce oral hygiene practices and ensure the area stays free from calculus deposits. If the surgical area becomes stable, this interval can be increased accordingly.

Further surgery may be indicated but the longest possible interval between episodes should be encouraged. This may mean postponing until there is a significant aesthetic or functional demand from the patient.<sup>8</sup>

In some cases, to reduce the need for repeated surgical intervention, it may be advisable to postpone surgery until the systemic or medical picture changes. For example if overgrowth is related to hormonal changes, surgery is likely to be more predictable if carried out in the post-natal or post-adolescence periods.<sup>21,22</sup>

## Conclusion

Gingival overgrowth has a variety of presentations and related aetiology. In order to manage this most effectively a clear history, examination and subsequent diagnosis will enable effective management. Prevention should be the priority unless a more serious diagnosis, which requires onward referral, is suspected. Adjunctive medical management may be appropriate; however, in many cases non-surgical management is all that is required. Should surgery be indicated, careful case selection is important and the technique implemented should be based on the individual case to maximise successful outcomes.

Specialist input may ultimately be required to manage these patients; however, the general dental practitioner should be able to reach a provisional diagnosis and initiate cause-related therapy in most cases.

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