

Prosthodontic Rehabilitation for a Patient with Acromegaly

G. McKenna*, M. Hayes† and F.M. Burke‡

Abstract - *Acromegaly is a condition which results from an excess of growth hormone produced by the pituitary gland after epiphyseal plate closure at puberty. The most common cause of acromegaly is a benign pituitary adenoma. Acromegaly is characterised by enlargement of the hands, feet, nose and ears; expansion of the skull and pronounced brow protrusion. From an oral standpoint, the most relevant symptoms are mandibular protrusion, spacing of the lower teeth and macroglossia. A 46 year-old patient was referred to University Dental School and Hospital by her General Dental Practitioner. The patient had been diagnosed with acromegaly and was receiving medical care from a consultant endocrinologist. The patient was partially dentate with only her lower anterior dentition remaining. She was wearing a complete upper denture but was unable to function effectively due to a lack of occlusal support. Treatment comprised non-surgical periodontal management, construction of upper and lower removable prostheses in a class III relationship and composite restorations on the remaining lower teeth.*

KEY WORDS: Acromegaly, Removable Prosthodontics, Rehabilitation

INTRODUCTION

Acromegaly is a multisystem disorder resulting from chronic exposure to supraphysiological levels of growth hormone and insulin-like growth factor 1 (IGF-1) after epiphyseal closure of bone plates¹. It is a rare disorder with global annual incidence estimated at 3 to 4 cases per million². Acromegaly is characterised by acquired progressive disfigurement, mainly affecting the face and extremities. The clinical signs and symptoms of acromegaly are listed in Table 1. There can also be soft tissue swelling of the internal organs particularly the heart and kidneys as well as the vocal chords resulting in a characteristic thick, deep voice and slowing of speech³. Sufferers of acromegaly may also experience generalised expansion of the skull at the fontanelles and pronounced brow protrusion often accompanied by ocular distension. Hypertrichosis, hyperpigmentation and hyperhidrosis may also occur⁴.

The facial features of patients with acromegaly are particularly characteristic where the nose is widened and thickened, the malar bone becomes prominent, the lips are thick and the facial lines are marked. The forehead and overlying skin becomes thickened, sometimes leading to frontal bossing. Many cases show a tendency towards mandibular overgrowth with prognathism, jaw thickening, maxillary widening, drifting of teeth and malocclusion. Radiographs of the skull typically reveal enlarged sella turcica and enlargement of the paranasal sinuses⁵. The angle between the ramus and the body of the mandible may increase. This, in combination with enlargement of the tongue may result in anterior displacement and spacing of the teeth with the development of an anterior

open bite. The most profound growth occurs in the condyle and ramus which results in the development of a Class III relationship between the jaws. The roots of posterior teeth often show evidence of hypercementosis and over-eruption of the posterior teeth may occur in an attempt to compensate for the growth of the mandible^{5,6}.

Case Report

A 46 year-old patient was referred to Cork University Dental School and Hospital by her General Dental Practitioner. The patient had a confirmed diagnosis of acromegaly secondary to a pituitary adenoma and was receiving medical care from a Consultant Endocrinologist. She had not undergone any surgical intervention for the pituitary adenoma. The patient first attended the Oral Surgery Department for a consultation to consider orthognathic surgery but liaison with her medical team revealed that her serum growth hormone levels were not stable enough to permit surgical intervention. Subsequently the patient was referred to the Restorative Department to explore prosthodontic based treatment.

On presentation, the patient was taking a number of medications prescribed by her medical practitioners including somatostatin (growth hormone-inhibiting hormone) and somavert (growth hormone antagonist). She was also taking a number of antidepressant medications and reported smoking approximately twenty cigarettes per day. The patient had noticeably large hands and feet and spoke with a thick deep voice. The patient displayed noticeable ocular distension and brow protrusion (Figure 1). Her mandible was also protrusive giving a distinctive Class III jaw relationship. Intra-orally, the patient was partially dentate. She was edentate in the upper arch with eight lower anterior teeth remaining (34, 33, 32, 31, 41, 42, 43, 44). Her oral hygiene was poor with staining and plaque deposits evident on all her remaining teeth. The prognosis of these teeth was judged to be very poor with grade I mobility recorded on 34, 33, 43 and 44; and grade II mobility recorded on 32, 31, 41 and 42. The patient was

* BDS, MFDS RCSEd, PhD, PgDipTL, FHEA

† BDS, MFDS

‡ BA, BDentSc, MSc, PhD, FDS RCSEd, FFD RCSI, PgDipTL

Table 1. *Clinical signs and symptoms of Acromegaly*

<i>Soft tissue swelling: visible enlargement in hands, feet, nose, lips and ears</i>
<i>Thick and hard nails</i>
<i>Deepening of creases on the forehead and nasolabial folds</i>
<i>Noticeably large pores</i>
<i>Thick and oedematous eyelids</i>
<i>Spacing of the teeth and jaw prognathism</i>
<i>Macroglossia</i>
<i>Hypertrichosis</i>
<i>Hyperpigmentation</i>
<i>Acanthosis nigricans</i>
<i>Excessive apocrine sweating</i>
<i>Hypertension</i>
<i>Mitral valve regurgitation</i>

wearing a full upper denture which had been provided approximately three years previously and had undergone a number of alterations as her condition had progressed. The patient's occlusion was completely deranged and provided no functioning contacts between the denture and the remaining dentition (Figures 2, 3). The patient appeared significantly overclosed and an enlarged freeway space of 12mm was recorded. The patient had no experience of wearing any form of lower removable prosthesis. There was some evidence of macroglossia but this could also have been due to tongue spread in the absence of lower posterior teeth.

In consultation with the patient, an initial treatment plan was developed which included non-surgical periodontal treatment for the remaining lower anterior teeth, provision of upper and lower removable dentures and composite resin restorations. Anti-smoking advice was provided in the dental hospital with a further referral to a dedicated service provided by the regional general hospital. The patient responded positively to the periodontal treatment with a significant improvement noted in her oral hygiene. Recorded plaque scores decreased from 84% at initial presentation to 28% three months later.

A lower acrylic partial denture was prescribed in order to anticipate future possible tooth loss. The new removable dentures were constructed in a Class III incisal relationship in order to provide a stable and functional occlusion (Figures 4, 5). Wrought steel clasps were provided on the lower denture in order to provide direct retention and the occlusal table was reduced by only replacing the second premolar and first molar tooth on each side. The jaw relationship was recorded using wax occlusal rims with an increase in occluding vertical dimension of 6 mm. Increasing the occluding vertical dimension reduced the patient's class III tendency, thus allowing them to achieve an edge-to-edge incisal relationship. Consideration was given to setting up the lower posterior denture teeth in buccal cross-bite to increase tongue space but this resulted in a very bulky lower denture at try-in. Further treatment options could have included the use of a neutral zone impression in order to determine the ideal tooth position for the lower teeth. Provision of the upper and lower dentures created sufficient inter-occlusal space to facilitate the restoration of the lower anterior teeth using composite resin. This improved the aesthetics of the lower anterior teeth and also provided an increased number of occluding units in order to stabilise the new occlusal scheme. Six months after denture delivery, the patient was functioning well, in terms of diet selection and speech, and is very satisfied with the overall aesthetic result (Figure 6). Unfortunately the patient has continued to smoke and her remaining natural dentition retains a poor prognosis.



Figure 1. *Patient's facial appearance*



Figure 2. *Patient's occlusion at initial presentation*



Figure 3. *Patient's occlusion at presentation, right lateral view.*

DISCUSSION

The primary aim of medical treatment for patients with acromegaly is to aggressively lower growth hormone levels to <2.5mg/L⁷. Therapeutic interventions include surgery, radiotherapy and medication. Successful management of pituitary adenomas can result in the reversal of soft tissue abnormalities. However, bony changes may persist and require corrective orthognathic surgery. The scientific literature reports an increasing number of cases of acromegaly treated successfully using orthognathic procedures including bilateral vertical osteotomies and coronoidotomies often in combination with glossectomies^{8,9}. However, caution is advised with orthognathic surgery in these cases as pituitary adenomas



Figure 4. Removable dentures at try-in stage



Figure 5. Removable dentures set up in Class III incisal relationship. The second molar teeth were removed from the upper denture.



Figure 6. Patient six months after denture fit and composite additions to lower anterior teeth. The wrought clasp on 44 was removed to improve patient comfort.

have a reported recurrence rate of 10-35% which can lead to significant relapse after surgery¹⁰.

This case report illustrates the successful oral rehabilitation of a patient suffering from acromegaly. Patients with this condition may present to their dental practitioner with complaints of malocclusion, difficulties with speech due to an enlarged tongue, tooth mobility or missing teeth secondary to diabetes mellitus. Prosthodontic treatment of patients with acromegaly necessitates a multidisciplinary approach with cooperation between medical and dental specialities. Some of the challenges which need to be anticipated in dealing with such cases include the enlarged mandible, the relatively

diminutive maxilla, hypertrophic tongue and increased vertical dimension¹. Follow-up care for acromegalic patients can also be challenging with frequent review appointments needed to ensure the acceptance and accommodation to new removable dentures.

Regardless of the presence of complicating factors such as agromegaly, clinicians must strive to construct removable dentures according to best prosthodontic principles. The importance of good quality primary and special tray impressions cannot be overemphasised. All clinicians should design their own removable prosthesis and communicate these designs to the dental laboratory effectively^{11,12}. In this case, the patient found that the gingivally approaching clasp on 44 was causing significant discomfort despite chairside adjustment and this was subsequently removed. Closer clinical examination revealed that the clasp was impinging on the right lateral mandibular frenal attachment. Whilst removal of the clasp did not significantly reduce retention this should have been avoided by placing the retentive arm of the clasp more distally or utilising an occlusally approaching clasp.

CONCLUSION

This case report illustrates the successful dental rehabilitation of a patient suffering from acromegaly using conventional removable prosthodontics. This patient will continue to attend Cork University Dental School and Hospital for maintenance of her remaining natural dentition and to monitor any further changes in her mandibular growth patterns.

ADDRESS FOR CORRESPONDENCE

Gerald McKenna, Lecturer in Prosthodontics and Oral Rehabilitation, Cork University Dental School and Hospital, University College Cork, Ireland. Email: g.mckenna@ucc.ie

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