

Provision of Resin Bonded Bridgework for a Patient with Microstomia Secondary to Scleroderma

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Abstract - Scleroderma is a connective tissue disorder that can present with orofacial involvement. A 48 year-old patient presented to Cork University Dental Hospital with concerns about the appearance of her upper central incisor teeth, which had become progressively mobile in recent years. A diagnosis of localised scleroderma had been made a number of years previously by her medical practitioner, and the patient reported that her scleroderma-associated microstomia had progressed significantly in recent years. Most reports of this condition advocate the use of sectional impression trays and sectional dentures to replace missing teeth. This report describes the use of resin-bonded bridgework (RBB) and discusses the possible advantages of this treatment option over those already presented in the literature.

KEY WORDS: Resin-bonded bridgework, scleroderma, connective tissue disorder, microstomia

INTRODUCTION

Scleroderma is a connective tissue disease that involves changes in the skin, blood vessels, muscles, and internal organs. It is a type of auto-immune disorder and is more prevalent in women than men. The disease usually affects people aged between 30 and 50 years old. It can present in conjunction with other autoimmune diseases such as systemic lupus erythematosus and polymyositis. In such cases, the disorder is referred to as "Mixed Connective Disease".

There are two distinct categories of this disease: systemic scleroderma and localized scleroderma. In systemic scleroderma, the fibrosis may extend to the internal organs, such as the heart, lungs, kidney and gastro-intestinal tract. Localized scleroderma usually affects only the skin on the face and hands. It develops slowly and rarely progresses to systemic disease. Localized scleroderma can be further sub-categorised into linear scleroderma and morphea. Linear scleroderma is characterized by a band of sclerotic induration and hyperpigmentation. Morphea presents as small violaceous skin patches or larger skin patches that indurate and cause loss of hair and sweat gland function¹.

CREST is an acronym for the clinical features that are seen in patients with systemic scleroderma - Calcinosis, Raynaud's phenomenon, Esophageal dysmotility, Sclerodactyly and Telangiectasia. Usually only two of the five symptoms of the CREST syndrome are necessary to be diagnosed with the disease.

Patients characteristically have a mask-like appearance, a beak-like nose, and tightening and wrinkling of the skin around the mouth with increased difficulty opening it (microstomia). The oral manifestations of scleroderma that have been described in the literature include limited opening, microstomia, mucous membranes that become thin,

pale and tight, mucosal ulceration, and sclerotic changes in the tongue and the periodontal membrane. One case described such severe limitation of mouth opening that extractions were required before upper gastrointestinal endoscopy could be performed. Denture border extension regions are subject to constricting distortion which hinders denture construction. Patients frequently suffer from finger deformities and a loss of tactile sensation which can impede denture insertion and removal. The dental management of these patients is complicated further by an increase in the incidence of poor oral hygiene. This is usually due to a combination of limited mouth opening and poor manual dexterity. The case presented in this article demonstrates how future progression of this condition needs to be taken into consideration when treatment planning for such patients.

Case Report

A 48 year-old patient presented to Cork University Dental Hospital with concerns about the appearance of her upper central incisor teeth. The patient had noticed that these teeth had become progressively mobile in recent years. The two central incisors had been crowned approximately 10 years previously but the 21 crown had recently been repaired with composite resin after the porcelain had fractured.

Generally, the patient was in good health. She was taking medications for hypertension and raised cholesterol. An extraoral examination revealed that the perioral tissues were shiny and taut. The patient's nose had a beak-like appearance and she had microstomia (Figure 1). A diagnosis of localised scleroderma had been made a number of years previously by her medical practitioner with no systemic symptoms reported. The patient was not taking medications as a result of this condition but she reported that the condition had progressed significantly in recent years. This progression is demonstrated by the fact that in 2007, when the patient attended Cork University Dental Hospital, her mouth opening was sufficient to allow

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Figure 1.



Figure 2.



Figure 3.



Figure 4.



Figure 5.



Figure 6.

endodontic treatment to be carried out on a molar tooth. However, when the patient presented for treatment 5 years later her maximum mouth opening was observed to be 19 millimetres (Figure 2).

The patient had a Class II div. 2 incisor relationship. An intraoral examination revealed that 11 and 21 were both grade II mobile. The porcelain fused to metal crowns were extremely ill-fitting and were bulbous palatally (Figures 3,4). An occlusal examination illustrated that there were heavy occlusal contacts on the palatal surfaces of the 11 and 21 on protrusive movement. There was approximately 8 millimetres of gingival recession labially associated with the two central incisors with periodontal probing depths of 2-3mm recorded. Radiographic examination revealed up to 80% horizontal bone loss associated with the two central incisors (Figure 5). The remainder of her dentition was in good periodontal health but her plaque score was recorded as 60% - an increase from a previous score of 30% charted in 2007. In addition, caries was noted on the distal surface of the 25.

A short-term treatment plan was drawn up to restore the carious lesion in the 25 in addition to carrying out occlusal adjustment on the two central incisors in an effort to reduce their mobility. In the longer term the decision was taken to extract the two central incisor teeth, place an immediate denture and to reconsider prosthodontic options after a suitable period of healing.

Restoration of the 25 proved to be extremely difficult due to the patient's limited mouth opening. A paediatric air turbine was necessary to facilitate caries removal. The resultant cavity was restored using glass ionomer cement (Fuji IX, GC Corporation, Tokyo, Japan) as contouring of other restorative materials proved too challenging.

In addition, impressions for the immediate denture were virtually impossible using conventional prosthodontic techniques. In consultation with the patient, and in light of the progressive nature of her scleroderma, it was decided to extract the two central incisors and replace them with an immediate fixed-fixed resin bonded bridge using the lateral incisors as abutment teeth. A sectional impression was taken of the upper and lower anterior teeth using a modified stock tray with the flanges removed (Figure 6). Photographs were sent to the lab for shade matching. The

resin-bonded bridge was designed with pink hue porcelain around the necks of the pontics in order to replicate the missing soft tissue and to create a more aesthetic clinical crown height.

Immediately following extraction of the 11 and 21, rubber dam was placed and the bridge cemented using a dual-cure resin cement (Panavia™ F, Kuraray Co. Ltd, Kita-Ku, Osaka, Japan) after chairside sandblasting. The occlusion was carefully checked to ensure even occlusal contacts in protrusive movements (Figure 7). Six months after treatment the immediate bridge was performing well, with no follow-up complications. The patient was very pleased with the prosthodontic outcome. Pink composite additions to the bridge had been planned, but were deemed unnecessary due to the very small amount of soft tissue recession following the extractions.

This lady continues to attend Cork University Dental School and Hospital routinely and is recalled every three months for periodontal maintenance and caries prevention measures. Due to the progressive nature of her scleroderma, it is anticipated that this patient's maximum mouth opening will continue to decrease. The patient has been made aware that any future restorative care would prove very challenging and the focus of this patient's continuing care is focussed firmly on disease prevention. Casts of the patient's mouth have been retained and could be used to construct a sectional impression tray in the future, should it become necessary to provide further prosthodontic treatment.

DISCUSSION

The incidence of localized scleroderma is estimated to be 2.7 cases per 100,000 persons per year ⁶, and the prevalence of orofacial involvement in localized scleroderma is reported to be 7%. Localized scleroderma could be confused with other fibrotic conditions, such as scarring and oral submucous fibrosis because of the similar clinical presentation. Usually, however, these conditions are associated with trauma or habit of chewing areca nut. Localized scleroderma also tends to have a well-defined border, while most submucosal fibrosis lesions do not. In the case above, the diagnosis had already been provided by the patient's medical practitioner.



Figure 7.



Figure 8.



Figure 9.

As a result of the issues outlined in the introduction, these patients present a particular challenge when prosthodontic care is required to replace missing teeth. Many innovations to assist with the treatment of these patients are described in the literature. One study advocated an exercise programme to improve the mouth opening of patients to aid denture insertion and removal ⁶, and also access for oral hygiene measures.

There are a number of case reports in the literature that describe the use of implant-supported prostheses in these patients. One describes the fabrication of an implant-supported overdenture and two others describe implant-supported fixed partial dentures ⁷. There is little information available about the success rate of individual implants placed in patients with scleroderma. One case series report described the placement of implants in 22 patients with rheumatic disorders and of these only six were CTD (Connective Tissue Disorder) patients. This study did note, however, that increased bone resorption (mean: 3.1 +/- 0.7mm) was seen in scleroderma cases ⁸. Another case series describes implant-prosthetic treatment for special care patients and, of these, two had scleroderma. The implants were placed and loaded successfully but insufficient hygiene was noted as a complication ⁹. All of the available literature on the placement of implants in scleroderma patients stressed the importance of a scrupulous maintenance programme and the need for optimal oral hygiene. As has been mentioned earlier, however, this can be difficult for patients with scleroderma and, in theory, we would expect to see a higher incidence of peri-implantitis in this group. For this patient in particular, regular periodontal therapy was becoming increasingly more difficult and plaque control was likely to deteriorate further with progression of her scleroderma.

Most of the available literature describes sectional and collapsible dentures for these patients. Flexible modified stock trays and sectional trays have been described ¹⁰ and have been used to fabricate sectional dentures. These have employed mechanisms such as cast Co-Cr hinges ^{9,11,12}, stud attachments ¹⁰, swing-lock attachments, pins ¹², a telescope system and magnets ⁸. Two case reports also described customized devices for the insertion and removal of dentures in patients with microstomia ¹³. A Valplast flexible RPD was provided for another patient with severe microstomia as a result of scleroderma ¹⁴. Unfortunately, most of the case reports in the literature do not have any long term follow up of these patients described. There is concern that, as the patient's condition deteriorates, these appliances may become progressively more difficult to manage. The patient described above reported a rapid worsening of her condition in the past few years and this prompted a revision of the original treatment plan from an immediate denture to that of an immediate resin bonded bridge. Furthermore, as previously mentioned, oral hygiene in these patients is frequently poor ⁶ and research has demonstrated that partial dentures may increase plaque formation and can promote greater occurrence of caries and periodontal disease ¹⁵.

Resin-bonded bridgework (RBB) is considered a successful and versatile option in the treatment of missing teeth. Predictable and user-friendly bonding systems have encouraged the development of adhesive alternatives to conventional bridgework ¹⁶. Compared with conventional designs, RBB is a more conservative approach to fixed prosthodontics with a much lower biological price. Patients are generally accepting of RBB as the amount of operative time is often much less compared with conventional bridgework and financial costs are typically lower ¹⁷. Evidence illustrates that RBB placed using current techniques can achieve high success rates with survival of up to 87.7% reported after 5 years ¹⁸.

At present there are no reports in the literature describing the use of resin-bonded bridgework in patients with microstomia. This case report presents a new option for clinicians to consider when replacing teeth in patients with limited mouth opening.

CONCLUSION

In cases where oral hygiene and denture wearing may be impaired due to microstomia, RBB presents a minimally invasive, fixed, cosmetic option for the replacement of teeth.

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