

Prosthodontic Management Of An Edentulous Patient With Systemic Sclerosis

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Citation

A Hooda, M Rathee. *Prosthodontic Management Of An Edentulous Patient With Systemic Sclerosis*. The Internet Journal of Family Practice. 2009 Volume 9 Number 1.

Abstract

Systemic sclerosis is a chronic multisystem progressive disease affecting the connective tissues. The thickened skin distinguishes scleroderma from other connective tissue diseases. The oral aperture may be greatly reduced and the resultant microstomia with limited oral access presents a challenge to prosthodontic treatment. A brief review of the manifestations of scleroderma and the clinical procedure for dental rehabilitation in a patient with microstomia is presented.

INTRODUCTION

Systemic sclerosis is a chronic systemic disorder of unknown etiology. It is characterized by thickening of skin and distinctive involvement of multiple internal organs most notably the lungs, gastrointestinal tract, heart and kidneys. The thickened skin distinguishes scleroderma from other connective tissue diseases. Patients can be divided into diffuse cutaneous systemic sclerosis and limited cutaneous sclerosis. In diffuse cutaneous systemic sclerosis progressive skin induration is present. These patients are at risk of early pulmonary fibrosis and acute renal involvement. While in limited cutaneous sclerosis patients generally have long standing Raynaud's phenomenon before manifestations of systemic sclerosis appear.¹⁻³ Progressive systemic sclerosis occurs more commonly in women, with a female to male ratio of 4:1 and peak age of onset at 30-50 years of age.^{1,3}

The symptoms of scleroderma that are of dental interest are the result of a slow collagenous fibrosis and loss of cellular definition. An abnormally small oral orifice, defined as microstomia, can be associated with scleroderma. Involvement of temporomandibular joint, which further reduces the oral opening, is frequently observed.³ The reduced mouth opening and rigidity of tongue presents difficulties to the dentist. The treatment in an edentulous patient poses problems using the conventional methods, sectional impressions that can be recorded in two or more parts and then reassembled outside the mouth is a useful procedure. Modified technique for denture fabrication in an edentulous patient of progressive systemic sclerosis with microstomia is being presented.

CASE REPORT

A 58 years old female edentulous patient presented to the department of Prosthodontics for a set of dentures. She was a diagnosed case of systemic sclerosis and a known case of hypertension for more than four years on regular treatment. Her general physical examination revealed hardening of facial skin, vertical peri-oral furrows, thinning of lips with reduced mobility. (Fig 1)

Figure 1

Fig 1: Showing extra-oral features.



Resorption of the distal phalanges with shortened claw like fingers was seen. (Fig 2)

Figure 2

Fig 2: Showing resorption of distal phalanges.



The mouth opening was restricted and the maximum inter-commissural diameter with open mouth was 40 mm. The lower third facial height was significantly reduced. Intra-oral examination revealed xerostomic, thin, pale oral mucosa and hypo-mobile tongue. The maxillary and the mandibular ridges were atrophic with small arch size. A complete denture was planned.

PREPARATION OF THE DENTURE

The microstomia posed a problem for denture preparation. The smallest diameter stock tray was chosen for preliminary impression, but still it was not possible to insert the tray loaded with impression material inside the patient's oral cavity. Hence, the modified impression technique was adopted. The metal stock tray was sectioned antero-posteriorly following the line passing to the left side of the midline. (Fig 3)

Figure 3

Fig 3: Showing sectional mandibular stock tray.



The impression of the right half was made and the left section of the loaded impression tray was inserted before removing the other half. The two parts of the impression were removed in the reverse order. Impression was assembled outside the mouth to get the primary cast. A similar technique was followed for the secondary impression with lock and key mechanism created in the handle of the sectioned custom tray. (Fig 4)

Figure 4

Fig 4: Showing sectional maxillary custom tray



The assembled final impression was poured to get the master cast. Conventional method for preparation of occlusal rims was followed.

Reduced mouth opening limited the use of Fox plane guide for the registration of occlusal plane. So, two metal scales were used on each side to access the occlusal plane. The visual methods are more significant in such patients than conventional and the anatomical landmarks were used as a guide. Try-in was done and denture was processed using compression molding technique. Patient was trained to use a rotational path of insertion and removal. She was advised to frequently sip water or non-sugary fluids for xerostomia. The cosmetic and functional result of the final denture was good. (Fig 5)

Figure 5

Fig 5: Showing final prosthesis.



DISCUSSION

Clinically evident skin thickening is the hallmark of

systemic sclerosis that distinguishes it from other connective tissue diseases. The distribution of skin thickening is invariably symmetrical and bilateral. Skin thickening in combination with fibrosis of the subjacent tendons account for contractures of the wrists, elbows and knees. Thick ridges at the neck due to firm adherence of skin to the underlying platysma muscle interfere with the neck extension.^{3,5}

The symptoms of systemic sclerosis that are of dental interest are the result of a slow collagenous fibrosis and loss of cellular definition. The exact mechanism of fibrosis changes is unknown, but hyperplastic changes of collagen have been documented.⁴ The facial skin and oral mucosa become thin and taut with a consequent mask-like appearance with reduced vertical dimension of lower third of the face. The nasal alae become atrophied resulting in a pinched appearance of the nose. The resorption of the terminal phalanges (acro-osteolysis) and flexion contractures produce shortened claw like fingers, as seen in our case also. Collagenous changes of oral mucous membrane cause it to appear atrophic with ulceration due to loss of vascular integrity in the oral mucous membrane. This mucosal fibrosis may also induce gingival recession and stripping of the attached gingival.⁶ Decrease in vascularity and oral tissue ischemia is the main cause of periodontal disease and tooth mobility.^{6,7} The thickening of the periodontal ligament is also a common manifestation.⁸ Dysphagia often develops as a result of deposition of collagen in the lingual and esophageal sub-mucosa producing a firm hypo-mobile tongue and an inelastic esophagus thus hindering swallowing. Sclerotic changes in tongue may make the mandibular denture particularly difficult to control.

Inadequate salivary flow due to fibrosis of the salivary duct compromises buffering within the oral cavity and allows the acidity produced by bacterial metabolism and gastric acid to erode dentition.⁷ It is overcome by advising frequent fluid intake and prescribing salivary substitutes in severe cases. Mandibular resorption occurs as a result of facial skin tightening, vessel constriction and the underlying taut musculature that exerts continuous pressure, causing ischemia to the mandible.⁸⁻¹¹

A reduced oral opening occurs in about 70%-80% of patients.⁴ Patients with microstomia can have difficulty in inserting and removing the complete dentures due to the restricted mouth opening. Loss of tactile sensation and the deformities of the fingers and nail-beds may complicate the

manual dexterity and impair the ability to place and remove the prosthesis. Supplemental removal devices may improve the situation and enhance the patient confidence.

Prosthodontic rehabilitation of microstomia patient's present difficulty at all stages from preliminary impression to fabrication of prosthesis. Several techniques based on flexible, modified standard trays and sectional trays has been proposed.¹² Sectional and collapsible dentures have been described for prosthodontic treatment of patients with microstomia.¹³

Impression procedure, recording jaw relationship and arranging teeth are particularly complicated if the opening of the mouth is restricted in relation to the size of the denture foundation to be covered. Different management techniques described are surgery, use of dynamic opening devices and modification of denture design. In cases where microstomia is not manageable by surgeries or dynamic opening devices, a modification of the treatment planning and prudent designing, the use of either sectional impression technique and/or sectional dentures, can overcome the apparent clinical difficulties,^{14,15} as in our case where sectional impression trays were used for making impressions. Accuracy of the jaw relation record is influenced by the extent of muscle and joint involvement so more of visual assessment and subjective evaluation was considered in the present case. The impression stock trays, custom trays, jaw relation recording and fabrication of the denture required technical modifications and special care to treat this particular case.

CONCLUSION

Fabrication and utilization of the prosthesis are complicated if a significant discrepancy exist between the size of the opening into the oral cavity and arch size and shape. Modified impression procedure and prosthesis design aid in fabrication of prosthesis for a patient with a limited mouth opening. The denture aids for a better function, health,

esthetics and overall well-being of the patient and thus a rewarding service can be provided by the prosthodontist.

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