

Spontaneous sequestration on oral mucosa associated with removable retainer

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Abstract

A 45-year-old female with Class III incisor relationship on Class I skeletal pattern came to orthodontic specialist clinic after referral from prosthodontic department. She requested to have lower dentition spaces to be closed before dental implant to be fitted. She had upper and lower dentures previously but not quite happy with the aesthetic. She is fit and healthy with diabetes mellitus type 2. Fixed appliance was done on the lower arch as the upper teeth were nicely aligned. Lower retainer was fitted after fixed appliance was removed (debonded). Several week later, she came with the complain of exposed bone on her lingual oral mucosa. The aetiology of sequestration, oral osteonecrosis and the association to diabetes mellitus is discussed in this case report.

Keywords: *diabetes mellitus, fixed appliances, osteonecrosis, retainers, sequestration*

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Introduction

Diabetes mellitus type 2 remains one of the major non-communicable diseases in Malaysia. An estimate of 3.9 million Malaysians aged 18 years and above suffer from diabetes mellitus (Chung, 2020). This is nearly 18.3% or one in five adults that suffers from this multi-systemic disorder. Diabetes mellitus type 2 could affect microvasculature, which lead to retinopathy, nephropathy, and neuropathy with impact on quality of life and life expectancy (Faselis *et al.*, 2020). It results in poor wound healing, reduce blood supply and is detrimental to oral health. A prolonged diabetic condition could proceed to harmful effect of bone metabolism and diminished bone micro built up mechanism (Clidhna & Cynthia, 2019).

These changes could predispose to bone dehiscence, sequestration, reduce osseus mucosa healing attachment and oral osteonecrosis in some condition.

Osteonecrosis of the jaw is an oral mucosa lesion affecting the bone of the maxilla or mandible. The lesion could be painful or asymptomatic. The diagnosis is done by the persistent presence of non-healing exposed bone or sequestration for a minimum of few weeks. It can be prevented by optimal oral hygiene, oral antimicrobial mouth rinses and antibiotic therapy (Khan *et al.*, 2016). The predisposing factors of osteonecrosis of the jaw can be multifactorial, such as immunocompromised patient, uncontrolled systemic disease such as diabetes mellitus, complication of radiotherapy and medication related to antiresorptive or

antiangiogenic drugs (Mandlin, *et al.*, 2021; Johnson *et al.*, 2019; Yehuda *et al.*, 2021). The lesion could also be introduced by traumatic incidence due to oral surgery, periodontal therapy and dental appliances.

There are many studies associating diabetes mellitus (DM) with oral health (Shawnda *et al.*, 2021; Melanie *et al.*, 2020; Nisha *et al.*, 2021). These studies concluded that, there is a need to improve dental health education on DM, to consider the risk of DM in every dental patient and to emphasize on preventive oral care to diabetic patient. Orthodontic treatment such as fixed appliances (braces), functional appliances, removable appliance, headgear and retainers could cause accidental trauma and pain to patient (Azrul *et al.*, 2019). The protruding wire from fixed appliances, sharp edges on removable appliances and fracture of stainless-steel clasps from Hawley's retainer can cause idiopathic trauma to oral soft tissue mucosa.

Case Presentation

A 45-year-old female diabetic mellitus type 2 patient came to USIM dental clinic for dental treatment. She was diagnosed with diabetic for the last 10 years ago and on medication (Tab metformin 1000mg x bd) with regular medical check-up at local government clinic. Apart from that, she does not take any other medication nor undergoes any oral carcinoma therapies. She was an irregular dental attendee and only came for occasional dental check-up. She had teeth restoration, scaling and extraction done before without any complication. She has a Class III incisor relationship on Class I skeletal pattern. Her molars and canines were both in Class I relationships. Apart from that, her overjet, overbite, curve of spee and centrelines were in normal range. Oral hygiene condition and periodontal status were all good. Her lip were competence and nasio-labial angle was average. No known habit was noted. All teeth presented except for upper lateral incisors, lower left second premolar and lower right second incisor. The teeth were missing due to extraction. The extraction was done due to caries and without any severe complication.

Apart from that, mild spacings (between 1 to 2mm) were noted on lower and upper arches with proclined lower incisors. The aetiology of her mild spacing was due to the missing teeth. The treatment aims for her is to close lower anterior space, place dental implant on 35 space and to issue new upper denture. Although there were mild spaces on distal of upper canines, she declines upper fixed appliance due to aesthetic reason. General risk of orthodontic treatment such as pain, trauma, root resorption and teeth decalcification were discussed with patient and informed consent was taken from her.

Lower fixed appliance (0.22 MBT prescription) was fitted to close the spaces and retroclined the lower incisors. The procedure begins with very light force 0.012 nickel titanium arch wire (Therma-Ti® Lite by American Orthodontic, USA), light force 0.014 nickel titanium (Therma-Ti® Lite by American Orthodontic, USA), medium force 0.016 nickel titanium (Therma-Ti® Lite by American Orthodontic, USA) and finished in 0.018 stainless steel arch wire (vacuum-remelted 304V by American Orthodontic, USA). The final arch wire was chosen as to maintain the proclination of lower incisors. Light force power chain from 46 (lower right first molar) to 34 (lower left first premolar) on 0.018 stainless steel were utilized to close the lower spaces for several months. In total, the orthodontic treatment takes around one year to completed and Hawley retainer were issue immediately after fixed appliance was debonded as shown in Figure 1.

The construction of her Hawley retainers consisted of prosthetic tooth on lower right lateral incisor, two Adam's clasps on lower first molars and labial bow to retain the aligned lower anterior teeth position. Her new upper denture was also fitted by colleague from prosthodontic department, and she was then referred to oral surgeon for dental implant on her lower tooth.

Several weeks later (after debonded procedure) she came and complaint of unusual lesion formation on her lower mucosa as shown in Figure 2.



Figure 1. Lower Hawley Retainer.



Figure 2. Oral sequestration located at lower lingual.

The oral lesion was asymptomatic and does not cause any pain. We could not establish any reason why she could not feel the pain from the lesion as no further investigation was done at the time. The mucosa surrounded the lesion was red in colour with no visible discharge. The lesion only occurs at one place and does not increase in size. Further examination on the complaint site revealed a sequestration of the soft tissue mucosa with some exposure of osseous bony structure. This could be due to sharp or tight contact between her Hawley's retainer and tissue mucosa that induce the early stage of traumatic osteonecrosis. Chlorhexidine mouth wash was then prescribed, and her lower retainer was trimmed at the lesion spot. She was then instructed to wear the retainer full time and to arrange an appointment with us as soon as possible if the lesion became worst. A month later, she was called for a review appointment and the oral mucosa lesion site has healed nicely.

Discussion

An almost similar situation was reported in 2018 whereby a 43-year-old man was diagnosed of lingual mandibular osteonecrosis after several days an excessive pressure was applied during impression procedure (Carmen *et al.*, 2018). A detachment of small soft tissue mucosa was reported on mandibular mylohyoid crest. The sequestrations, as similar to our case, is a typically correlated with reduced blood supply of soft tissue and bone in response to various systemic disease. Reduced micro blood supply will lead to ischemic lesion of lingual mandibular area (Visscher *et al.*, 2013). Any trauma to oral mucosa could initiate or worsen the lesion.

In many cases, Hawley retainers were constructed based on patient study model and sometimes minute deformation on the impression were not visible. This in turn will translate to high pressure spot or sharp point on the appliance. This will compress the soft tissue mucosa when patient wear the appliance. Extra care should be taken during impression procedure as not to put any

pressure point on the impression tray. Almost all patients will develop small painful ulcer and discontinue to wear the appliance. In this case, there are possibility of ischemia and neuropathy of her oral mucosa due to DM that preceded to osteonecrosis.

Apart from systemic diseases, patient undergoes treatment with bisphosphonates and antiangiogenic antiresorptive drug were commonly associated with osteonecrosis (Julia *et al.*, 2020; Toshikazu *et al.*, 2021; Tocaciu *et al.*, 2017). However, in our case, patient does not take any of the medication nor undergoes any oral carcinoma therapies. Patient also claim does not have any other known medical condition. This situation was managed by the removal of high/sharp spot on the Hawley retainer to alleviate the pressure from the mucosa soft tissue. Thus, promoting blood supply recovery and wound healing. Chlorhexidine mouth wash was also prescribed as it is known to reduce oral inflammation (Kakarla & Prem, 2020). No analgesic was needed as the patient does not feel any pain and discomfort. Patient was recall in a month time to review the lesion. A one-month review was chosen as to give ample time for the lesion to heal. In the recall appointment, the lesion has completely closed and heal.

Conclusion

Well controlled diabetes mellitus is crucial for averting harmful effects on oral health. It could result in reduce blood supply and reduced tactile/pain sensation. This could lead to trauma induced oral osteonecrosis in certain unfavourable condition. Although orthodontic induced sequestration of oral mucosa is a rare occurrence, several caution must be taken during the treatment to prevent this unfortunate event. A detailed medical history must be taken and clarified before any dental treatment is done. Apart from that, impression procedure must be done with extra pre-caution to prevent any pressure point on the study model. Hawley retainers must be checked for any sharp point or pressure spot before appliance fitting. Patient should be reminded to check for any pain of lesion that occurs on the soft

tissue and should call for appointment as soon as possible.

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