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CLINICAL SECTION

Angular cheilitis occurring during orthodontic treatment. A case series

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Clinical experience has shown that angular cheilitis can occur during orthodontic treatment and may persist into retention, but the incidence of the condition is unknown. The purpose of this paper is to increase the awareness among clinicians of angular cheilitis occurring during orthodontic treatment. It also proposes a treatment regime which may be used.

Key words: Angular cheilitis, orthodontics treatment regime

Introduction

Angular cheilitis is a multi-factorial disease of infectious origin. Clinically it is characterized as an eroded and erythematous non-vesicular lesion radiating from the angle of the mouth which may be unilateral or bilateral in presentation.[1] Predisposing factors include micro-biological changes, haematological deficiencies and loss of vertical dimension in the elderly.[2,3] Angular cheilitis has also been linked in the dental literature to immuno-compromised individuals,[4] and atopic patients. The peak incidence for angular cheilitis is during the third, fifth and sixth decades.[3] Öhman *et al.*[5] published a clinical scale to help grade the appearance of angular cheiltis. A recent case report was published suggesting that angular cheilitis occurred during orthodontic treatment due to a nickel allergy.[6]

Clinical experience has shown that angular cheilitis can occur during orthodontic treatment and may persist into retention. The purpose of this paper is to increase the awareness among clinicians of angular cheilitis occurring during orthodontic treatment. It also proposes a treatment regime which may be used.

Case report 1

A 19-year-old boy had been attending a specialist orthodontic practice for 23 months for treatment of his class II division 1 malocclusion using fixed appliances. He had no relevant medical history, no known allergies and had no courses of antibiotics recently. He was a non-smoker with competent lips. Extra-oral examination revealed a small erythematous lesion affecting the left angle which extended 3 mm from the vermillion border to the surrounding skin. There was clear debris of dead skin surround the lesion (Figure 1). It had been present for several days and was not preceded by prodromal symptoms associated with herpes labialis. Intra-oral examination showed no other disorders and oral hygiene was found to be fair to good.

An empirical diagnosis of angular cheilitis was made, grade 1 according to the scale published by Öhman *et al.*[5] Thorough debridement of the dead skin using a sterile cotton wool roll was performed to leave a clean lesion which bled slightly.

At the patients next visit the area had healed well and the patient reported it took 5 to 6 days to resolve (Figure 2). The patient's orthodontic treatment continued uneventfully and the lesion did not return.

Case report 2

A 14-year-old boy had been attending a specialist orthodontic practice for 18 months for treatment of his class II division 1 malocclusion using fixed appliances. He had no relevant medical history, no known allergies and had no courses of antibiotics recently. He was a non-smoker with competent lips. Extra-oral examination revealed a deep erythematous lesion affecting the left angle which extended 5 mm from the vermillion border to the surrounding skin. This lesion was weeping slightly and was clearly sore and tender on mouth opening (Figure 3). It had been present for several weeks and was not preceded by prodromal symptoms associated with herpes labialis. Intra-oral examination showed no other disorders and oral hygiene was found to be fair to good. An empirical diagnosis of angular cheilitis was made, grade 2. Thorough

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Figure 1 Angular cheilitis (grade 1) affecting left angle

debridement of the lesion was performed using a sterile cotton wool roll. At review two weeks later the lesion did not resolve and the patient was prescribed miconazole nitrate 2% gel and asked to apply topically four times a day for 2 weeks. At the patients next visit the area had healed well and the patient reported it took several days to resolve (Figure 4). The patient's orthodontic treatment continued uneventfully and the lesion did not return.

Case report 3

An 11-year-old girl had been attending a specialist orthodontic practice for 16 months for treatment of her class II division 1 malocclusion using fixed appliances. She had no relevant medical history, no known allergies and had no courses of antibiotics recently. She was a non-smoker with competent lips.

Figure 2 Healthy left angle six weeks after debridement with sterile cotton wool roll

Figure 3 Angular cheilitis (grade 2) affecting left angle

Extra-oral examination revealed a small erythematous lesion affecting the left angle which extended 4 mm from the vermillion border to the surrounding skin and was sore and tender on mouth opening (Figure 5). It had been present for 1 week, was not preceded by prodromal symptoms associated with herpes labialis and the patient had been applying choline salicylate (Bonjela) to no effect. Intra-oral examination showed no other disorders and her oral hygiene was found to be fair with minimal plaque deposits on most teeth especially along bracket surfaces.

An empirical diagnosis of angular cheilitis was made, grade 2, and thorough debridement of the lesion was performed using a sterile cotton wool roll. At the patient's next visit the lesion had not responded and she was prescribed miconazole nitrate 2% gel and asked to apply topically four times a day for 2 weeks. The patient returned to the practice 5 weeks later with complete

Figure 4 Healthy left angle six weeks after commencement of miconazole nitrate 2% gel

Figure 5 Angular cheilitis (grade 2) affecting left angle

resolution of her condition and a complete return to health of the left angle (Figure 6). At the patient's next visit the angular cheilitis affecting the left angle had returned. The patient was instructed to repeat the use of the miconazole nitrate 2% gel and return in 2 weeks for observation. At this visit it was noted that the lesion had successfully resolved.

At the patient's next visit severe angular cheilitis was observed on the right angle (Figure 7) which was recorded as a grade 4. This had not responded to miconazole cream in the last two weeks and was very painful on opening. It was decided to stop fixed orthodontic treatment at this visit and debond the appliances. The lesions improved spontaneously over the next two weeks.

Following 2 months of night-time wear of vacuum formed retainers, mild angular chelitis had returned to both angles (Figure 8), and a request was made to the

Figure 6 Healthy left angle five weeks after commencement of miconazole nitrate 2% gel

Figure 7 Angular cheilitis (grade 4) affecting right angle, not responsive to miconazole nitrate 2% gel

patient's general medical practitioner to undertake a range of haematological tests including full blood count, serum ferritin, serum vitamin B12 and red blood cell folate. The results were within normal limits. At the patient's next visit the lesion had resolved and no further signs of angular cheilitis were experienced by the patient over the next 18 months (Figure 9).

Discussion

Angular cheilitis can be a painful condition affecting the angles of the mouth. The cases presented in this paper indicate that angular cheilitis can occur to otherwise healthy patients undergoing orthodontic treatment. None of these patients had a nickel allergy or were immuno-compromised. As shown in case 3 above, it has been observed to persist into the retention period during wear of Essix type retainers.

Figure 8 Angular cheilitis (grade 1) affecting both angles during retention phase with Essix type retainers

Figure 9 Healthy angles during retention phase

Angular cheilitis is largely a clinical diagnosis, however microbiological studies have shown that it has been associated with various microbiological species, including *Candida*, *Streptococci* and *Staphylococci*, it is most commonly classified in the dental literature as a manifestation of oral candidiasis.[7–9] Oral candidiasis is an inflammatory reaction usually caused by overgrowth of the commensal yeast *Candida albicans*, which is an opportunistic pathogen, but other fungal organisms may be involved.[2] Orthodontic treatment has been linked to changes in the oral flora including a rise in *Candida albicans* with both fixed and removable appliance therapy.[10–19]

Acrylic denture wearers are often at an increased risk of candida carriage. This is often linked to ill-fitting dentures and poor denture hygiene. A biofilm with *Candida albicans* forms on the fitting surface of the denture, and may cause denture stomatitis.[2] However, the patients reported in this paper all had fixed appliances and good to fair oral hygiene.

Orthodontic therapy, whatever the choice of appliance, requires the introduction of foreign objects and materials into the oral cavity. The microflora of the mouth is highly diverse, and its composition, metabolic activity and pathogenicity are affected by several factors, intrinsic and extrinsic.[7,9] It has been well documented that orthodontic appliances have effects on the oral microbiota.[10–19] Atack *et al.*[13] reported that fixed orthodontic appliances inhibit oral hygiene to a great extent, and also create new surfaces for plaque and debris to accumulate. This in turn predisposes to a greater risk of infection and carriage of oral microbes.

The rate of intra-oral carriage with *Candida albicans* in non-orthodontic patients is usually around 40%,[10] however, Addy and coworkers[10,12] demonstrated an increase in *Candida albicans* carriage in patients during removable appliance therapy. Similarly, Hagg *et al.*[15] were able to show an increase in the rate of carriage of *Candida* and coliform species following bonding of fixed appliances. This suggests that orthodontic treatment can result in a conversion to a carrier state for *Candida albicans* which could then lead to angular cheilitis. Further studies are required to investigate the prevalence of the condition during orthodontic treatment and if it does persist beyond active treatment into the retention phase.

Miconazole nitrate gel (Daktarin) is an antifungal with some activity against Gram-positive bacteria including streptococci and staphylococci and is the treatment of choice for angular cheilitis. A 15-g tube can now be sold directly to the public without the need for a prescription.[20]

Conclusions

Angular cheilitis can occur during and after orthodontic treatment. The following treatment regime has proved helpful following diagnosis:

- thorough debridement of the affected angle with sterile cotton wool rolls together with advice on oral hygiene instruction;
- at review, if the lesion has failed to resolve then advise the use of miconazole nitrate 2% gel applied topically four times a day for 2 weeks;
- if the lesion still fails to resolve then request haematological tests from general medical practitioner including full blood count, serum ferritin, serum vitamin B12 and red blood cell folate together with microbiological sampling to identify alternative topical antimicrobials. Alternatively the patient could be referred to a local oral surgery or oral medicine consultant;
- finally, if the lesions are recalcitrant, painful and causing distress then removal of fixed orthodontic appliances may be necessary.

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