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Case Report

Simultaneous Occurrence of Periodontal and Skin Abscesses in a Nigerian Girl: Case Report

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ABSTRACT

We report a case of a girl with a perplexing clinical feature of simultaneous occurrence of periodontal and skin abscesses that resolved following periodontal therapy. Infections and inflammations have the capacity to metastasize and despite the localized nature of periodontal disease, infection of the sulcus/periodontal pocket can lead to inflammatory responses beyond the periodontium. C-Reactive Protein (CRP) is primarily a non-specific marker of inflammation with multiple pro-inflammatory properties and some studies have noted its concurrent reduction and CVD following periodontal therapy. A 12 year old Nigerian girl presented clinically with simultaneous occurrence of aggressive periodontitis, periodontal and skin abscesses with eventual teeth loss. Pre-operative quantitative analysis of plasma CRP was 1500mg/l, moderate growth of *Staphylococcus aureus* and *Porphyromonas gingivalis* were isolated from the skin and periodontal pus respectively and basic heamatological values were within normal range. Intensive non-surgical periodontal therapy was done at intervals of two months complemented with high dose of Amoxicillin and Metronidazole for seven days. The periodontal condition resolved, skin abscesses healed with scarring and the removable acrylic partial dentures delivered improved the patient's appearance and eventual overall quality of life. This case may suggest a possible link between periodontal and skin disease because of the resolution of these conditions and concurrent lowering of the serum level of CRP following periodontal therapy. Periodontal disease may be implicated as an etiology of the skin abscess because of the resolution of these disease conditions following periodontal therapy

Key words: Case report, Periodontal abscesses, Skin abscesses, CRP, Non-surgical periodontal therapy, Resolution

BACKGROUND

Inflammatory disorders/diseases (local and systemic) can simultaneously occur or may develop sequentially where progression or exacerbation of one disease may affect the second disease (Van Dyke *et al* 2013). Despite the localized nature of periodontal disease, infection of the sulcus/periodontal pocket can lead to inflammatory responses beyond the periodontium (Van Dyke *et al* 2008). Infections and inflammations have the capacity to metastasize (Chiang *et al* 2013) and periodontal disease is an inflammatory disease induced by a microbial biofilm. (Loe *et al* 1965) There is an established assumption that periodontitis is an infection that causes inflammatory disease that metastasizes (bactereamia and infection) at non-oral sites. From the understanding of the biology of a relationship between periodontitis and systemic disease, it is clear that this relationship is not

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linear, but complex (Van Dyke *et al* 2013) Bacteria and inflammatory mediators may enter the blood and disseminate systemically and have a measurable impact on systemic inflammation.

Epidemiological evidence linking periodontitis to the progression of systemic disease such as cardiovascular disease, adverse pregnancy outcomes and diabetes mellitus is associated with both bactaraemia and elevated levels of various markers of systemic inflammation (Kinane *et al* 2005). Non oral infections linked with systemic infections described over a decade ago among others include endocarditis, lung infections, liver and brain absceses (Van Winkelhoff *et al* 1999). Bacteraemia is aggravated more by mechanical means during toothbrushing, chewing, oral examination, endodontic treatment, scaling and root planning (Kinane *et al* 2006, Debelian *et al* 1995). Pro-inflammatory mediators such as IL-β, IL-6, TNF-α and PGE_2 produced locally in the inflamed gingival tissues may "spill" into the circulation and have systemic impact such as introduction of endothelial dysfunction (Amars Gokce *et al* 1995, Elter *et al* 2006). C - reactive protein (CRP) has multiple pro-inflammatory and pro-artherogenic properties and it remains established as a marker of cardiovascular disease (CVD) risk. CRP is primarily a non-specific marker of inflammation and some studies(Van Dyke *et al* 2007, Van Dyke *et al* 2008,Van Dyke *et al* 2003) noted the concurrent reduction of CVD following periodontal therapy with similar reduction in key mediators of systemic inflammation. Ideally, following inflammation there should be rapid and complete elimination of leucocytes; inadequate resolution and failure to return tissue to homeostasis results in neutrophil mediated destruction and chronic inflammation with matrix and tissue scarring and fibrosis (Montebugnoli *et al* 2005, Taylor *et al* 2006, Hussain *et al* 2009). Although clinical proof of causality is elusive, it is clear that the three aspects of the pathogenesis of periodontal disease; infection, inflammation and adaptive immunity, all have a periodontal role and impact on the systemic inflammatory immune response that either initiates or mediates a wide range of systemic diseases. (Montebugnoli *et al* 2005)

Some surveys also showed that severe alveolar bone loss and loss of multiple teeth in children is less than that in young adolescent (Vidal *et al* 2009, Nakkjima *et al* 2010, Perry *et al* 1990) it is however revealed that while chronic periodontitis is commoner in adults, aggressive periodontitis may be commoner in children and adolescents (Loe *et al* 1991). Genetic /hereditary linkages with aggressive periodontitis have also been shown (Oliver *et al* 1998) and various neutrophil functional defects were reported in localized aggressive periodontitis (LAgP) patients but the influence on the susceptible individuals is unknown because these defects may still be present in these group of patients after treatment (Armitage *et al* 1999, Hart *et al* 1997).

Successful treatment of localized aggressive periodontitis mostly recommended by some authors is a combination of surgical or non-surgical root debridement depending on early diagnosis and provision of an enabling environment that is free of infection (Daniel *et al* 1996, Dennison *et al* 1997). It is reported that scaling, root planning and photodynamic therapy have similar effects on crevicular TNF –Xs and RANK L (receptor activator of nuclear factor-kappol BL) level in aggressive periodontitis patients (Dennison *et al* 1997). Microscopic culture of plaque samples from generalized aggressive periodontitis (GAP) patients who do not respond to standard periodontal therapy may be required to identify the susceptibility of the periodontal pathogen (DeOliveire *et al* 2009). It is shown that failure to treat aggressive periodontitis appropriately can result in progressive and often rapid loss of periodontal supporting tissues and eventual tooth/teeth loss (Van Winkelloff *et al* 1996). Papapanou *et al* (2000) and Locker djokovic (2010) reported that children with oligodontia experienced substantial functional and psychosocial impact from this condition that is more severe, than the impact of caries and malocclusion.

The diagnosis of periodontal abscess should be based on the overall evaluation and interpretations of the chief complaint in conjunction with the clinical and radiological findings (Locker *et al* 2010). Pure mechanical debridement with either surgical drainage through the periodontal pocket or scaling and root planning (SRP), debridement of the soft tissue wall and systemic antimicrobial therapy are recommended for the management of periodontal abscess (Colbet *et al* 2004). None of the antimicrobials are able to resolve the infections entirely which implies that mechanical debridement and sometimes surgical therapy have to be used and the recommended general principle of systemic antimicrobial administration is a high dose delivered during a short period of time while resistant strains are also reported (Colbet *et al* 2004, Herrera *et al* 2005). Periodontal therapy (scaling, root planning and antibiotic treatment) has been shown to reduce levels of some inflammatory and acute phase markers which further implicates the periodontium as a source of systemic inflammatory mediators such as CRP, TNF-α and IL-6 (Jaramillo *et al* 2005). Full mouth extraction in patients with advanced periodontitis showed significant reduction in CRP, plasminogen-activator-inhibitor-1 fibrinogen and WBC (Zaoutis *et al* 2006).

It is reported that the incidence of skin and soft tissue infections has rapidly increased over the past decades following the emergence of methicilin-resistant staphylococcus aureus (MRSA) (Silva *et al* 2011). MRSA are suggested to be the most common cause of skin and soft tissue infections with identifiable risk factors which are not clinically useful (Boggs *et al* 2011). The prevalence of MRSA is reported to have geographical and demographic variations (Fridkin *et al* 2005). Skin and soft tissue abscesses, especially skin abscesses require urgent evaluation for potential incision and drainage and antimicrobial therapy (Pallin *et al* 2008, Hersh *et al* 2008). Only few evidence-based consensus guidelines exist for the management of cutaneous abscesses (Stevens *et al* 2005). Routine use of antibiotics is only indicated in patients with draining cutaneous abscess that have surrounding cellulitis (Gorwitz 2008) and the all-inclusive routine culturing minimally (or not all) alter patient management (Abrahamina *et al* 2007, Baumann *et al* 2011).

CASE DESCRIPTION

A.K is a Nigerian female child aged 12 years brought by her mother to the Dental Center, University College Hospital, Ibadan seeking management of a condition which the mother claimed looked strange to her. Informed consent was obtained from the mother and patient. The chief complaints were very mobile teeth and abscesses around the teeth with eventual exfoliation of all the deciduous and permanent teeth except the few standing teeth that the patient presented with which were also very mobile and concurrent skin abscesses on the scalp, neck and limbs (Plates 1,3 & 4). The mother reported no pre-natal problems nor intake of any special medication during the patient's pregnancy period. No systemic problems such as diabetes, blood dryscrasias, cardiopathy or allergic responses to any product or medication were detected after series of related clinical investigations. Microbiological findings from the pus of the skin and periodontal abscesses showed moderate growth of gram positive cocci (staphylococcus aureus) and gram negative rods (predominantly Porphyromonas gingivalis) respectively which were both sensitive to amoxicillin and metronidazole & the quantitative analysis of the plasma CRP level was 1500mg/l. Basic heamatological findings were all within normal range and dermatological examination showed multiple abscesses on the scalp, neck and limbs with patched areas of healed lesions. Extra-oral clinical examination revealed obviously disturbed and anxious young girl with bilaterally depressed medial canthus of the eyes and loss of fullness of the cheeks secondary to missing teeth while intra oral clinical examination showed partial edentulousness of the four arches (figure 1). The teeth present were:

$$\frac{76 \quad\quad 7}{763 \quad\quad 367}$$

All the teeth present were mobile with degree of mobility ranging from Millar mobility index grades II and III. These teeth also had periodontal abscesses with pus discharge through the gingival sulcus. Multiple scalp abscess and scaring did not affect hair growth (figure 5). There was no carious tooth and the gingivae were not inflamed but there was oral malodour because of the pus discharge and moderate accumulation of plaque and calculus. Periapical radiographs of the teeth with Millar mobility index III showed gross alveolar bone loss with areas of vertical defects and diagnosis of chronic periodontal abscess were made based on these clinical and radiological findings

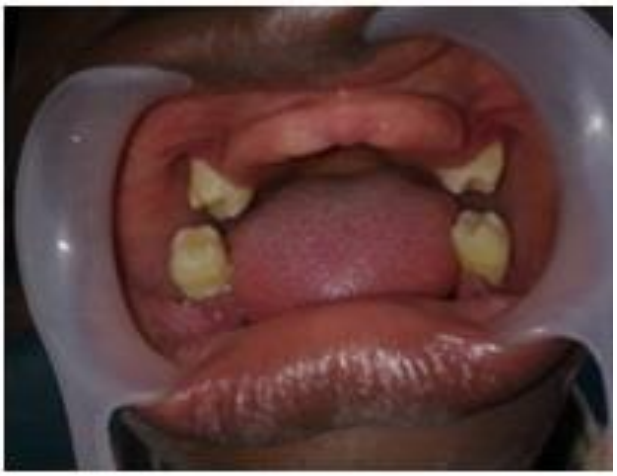

Plate 1
Intra-oral photograph showing all the four second molar teeth

The initial phase of dental treatment given included professional prophylaxis, scaling and root planning, basic instructions on oral hygiene and the use of 0.12% chlorhexidine mouth rinses. No tooth was extracted, except the seemingly" hope less" teeth (lower right and left canines and first molars and the upper left first molar (Fig 2) which eventually exfoliated. Hydrogen peroxide solution, normal saline and 0.12% chlorhexidine gluconate were used for the periodontal debridement and the patient was simultaneously placed on an antibiotic regimen of Amoxicillin capsules 250mg 8 hourly and metronidazole 200mg 8 hourly for seven days. The periodontal debridement therapy with 0.12%

chlorhexidine gluconate was intensified around these teeth and repeated at regular period interval of two months for one year which arrested periodontal disease progression, skin lesions also healed with scars and the plasma CRP level also reduced to 15mg/l. At this stage, upper and lower functional removable acrylic partial dentures replacing the missing teeth were then fabricated and inserted (figures 6). Consequent to the inserting of the partial dentures, partial periodontal stability of the teeth and healing of the skin lesions even with scarring (figure 7), the patient's appearance, psychosocial and emotional status were enhanced as evidenced by her hyperactivity in the class as reported by her class teacher.

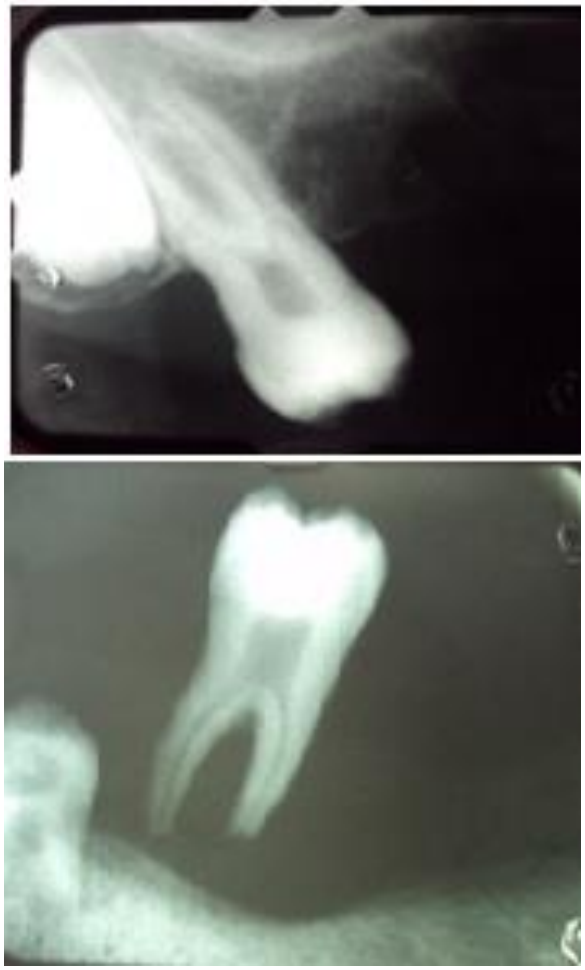

Plate 2
Periapical radiographs of right & left first molar & upper left molar teeth

The patient kept the maintenance follow-up visits every four months during which scaling, root planning and periodontal debridement are done and no tooth has been lost after wards. The dentures still fit because there has been no evidence of progression of the disease, such as acceleration for residual ridge resorption, which facilitates adaptation of the prostheses and masticatory function and the dentures were well tolerated by the patient.

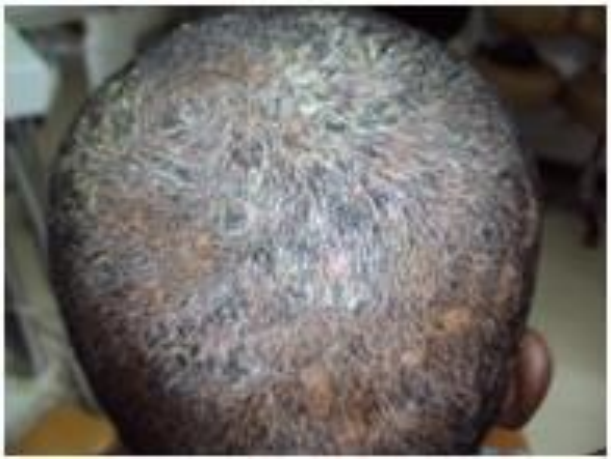

Plate 3
Scalp abscesses pre-antibiotic therapy

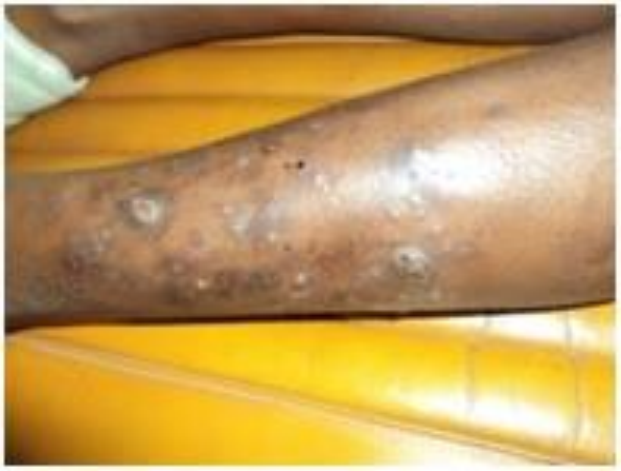

Plate 4
Skin lesions pre-antibiotic therapy

Plate 5
Scalp abscesses did not affect hair growth

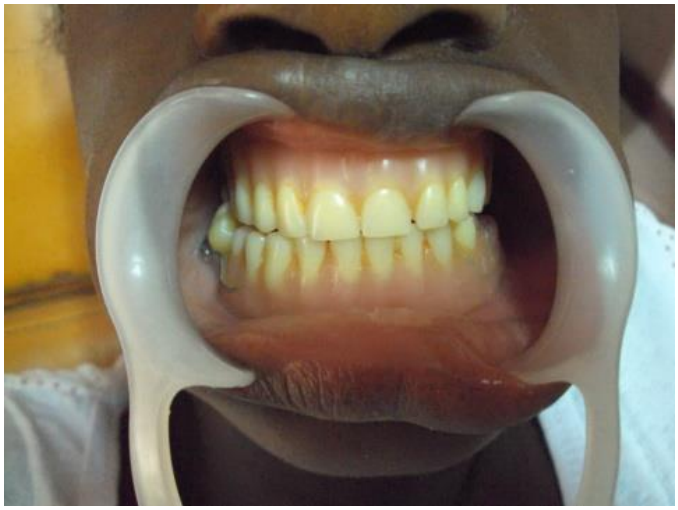

Plate 6
Full upper & lower acrylic partial dentures inserted after periodontal stabilization of the remaining standing teeth

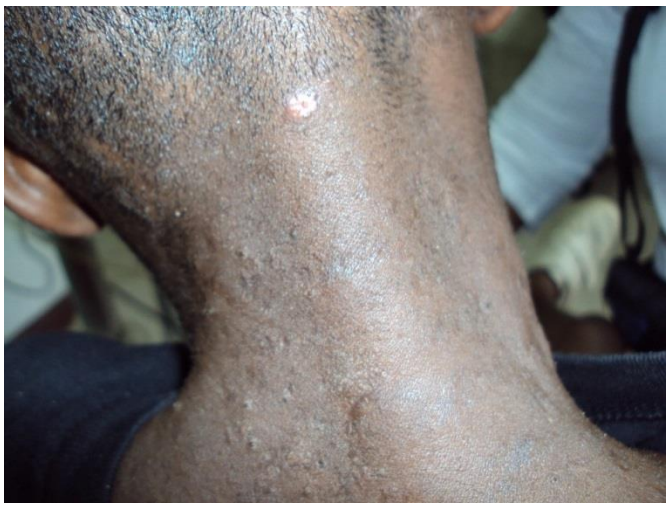

Plate 7
Skin lesions healed with scarring post-antibiotic therapy

DISCUSSION

This report is a case of a 12 year old female patient with multiple periodontal and skin abscesses appearing simultaneously coupled with exfoliation of several of her teeth before presentation at the clinic.

The early sign of this aggressive periodontitis in this patient by affectation of the deciduous teeth supports the findings of (Specktor *et al* 1985 and Sjodin *et al* 1993). Haematological investigations in this patient did not reveal any blood dyscrasias or defects which may account for the ceasation of progression of the periodontal disease after treatment, which supports the reports of (Daniel *et al* 1996) and Dennison *et al* 1997). The simultaneous resolution of the skin and periodontal abscesses may be in keeping with the findings of (Montebugnoli *et al* 2005, Taylor *et al* 2006, Herrera *et al* 2005 and Jaramillo *et al* 2005), that periodontal therapy reduces plasma CRP level and subsequent infection resolution. The keeping of maintenance follow-up visits for periodontal therapy by the patient would have provided an enabling environment that is free of infection which led to a successful periodontal treatment. Systemic administration of the antibiotics that the isolated microorganisms were sensitive to may have also contributed to the good response to therapy. The initial progressive loss of periodontal supporting tissues in this patient may be due to failure to treat the condition at that time which is reported in some studies (Dennison *et al* 1997, Van Winkelloff *et al* 1996).

This patient exhibited substantial functional and psychosocial impact on her quality of life both at home and in school which was evident by her look of fear and anxiety at initial presentation in the clinic. This supports the findings of Locker *et al* 2010 that children with oligodontia experienced substantial functional and psychosocial impact from this condition that is more severe, than the impact of caries and malocclusion.

The patient was placed on high dose of antimicrobials for a short period of seven days to compliment the non-surgical periodontal therapy and regular mechanical debridement in line with the suggestions of Jaramillo *et al* 2005 and Herrera *et al* 2005. Microscopy culture and sensitivity of pus from the skin abscesses showed moderate growth of staphylococcus aureus that is sensitive to Amoxicillin which the patient responded to leading to healing of the skin lesions although with scarring.

In conclusion, this is a perplexing clinical entity because of its unusual simultaneous occurrence of aggressive periodontitis, periodontal and skin abscesses which had a good treatment outcome both of the periodontal and skin diseases and lowering of CRP following regular mechanical debridement and short duration high dose antibiotics. This case may suggest a possible link between periodontal and skin disease.

Clinical significance: Possible link between periodontal disease and skin disease because of the marked lowering of serum CRP following non-surgical periodontal therapy. Periodontal disease may be implicated as an etiology of the skin abscess because of the resolution of these disease conditions following periodontal therapy.

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