Periodontal diseases in children and adolescents

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Professor Clerehugh will be speaking on this subject on Saturday 3 May at the 2008 British Dental Conference and Exhibition, held at the Manchester Central Convention Complex.

CONFERENCE

Unlike in adults, currently there are no nationally agreed guidelines for the assessment of periodontal diseases in children and adolescents. This paper considers the range of periodontal diseases that can affect youngsters and documents a simple periodontal screening system for the younger age groups. It includes principles of periodontal diagnosis and management for the practitioner to apply to the young patient and considers when to treat in practice and when to refer to a specialist.

A variety of periodontal diseases can present in children and adolescents, some of which are rapidly destructive. After years of debate and lack of consensus, a new classification system was agreed at the 1999 International Workshop for a Classification of Periodontal Diseases and Conditions.[1] This comprised eight separate categories, all of which are applicable to the younger age groups. An up-to-date classification of the periodontal diseases allows the clinician to consider the full range of periodontal disorders that can affect the patient and provides a basis for their diagnosis and subsequent management (Table 1).

Gingivitis

Gingivitis was added as a new category in 1999.[1] Plaque-induced gingivitis is common in young as well as older age groups and modifying factors can be identified from the history and examination that can influence the natural course and management. It is reversible when the aetiological agent, the plaque biofilm, is removed, and while it is not associated with attachment loss or bone loss, it is worth bearing in mind that it can occur on a periodontium with reduced support in which the attachment loss and bone loss has previously occurred and is not progressing.

Plaque displays typical properties of biofilms and microbial communities and the plaque ecology is a critical determinant in disease development.[2] Crucially, gingivitis may be more important than previously thought. From the Fifth European Workshop in Periodontology in 2005, it was considered that gingivitis and periodontitis are a continuum of the same inflammatory disease.[3] However, there is a wide range in individual susceptibility and not all individuals with gingivitis will progress to destructive periodontitis.[4]

Less commonly, non-plaque-induced gingival lesions can present and the diagnosis and management of some of these is challenging and may require specialist referral.[5]

Chronic periodontitis

It is significant that the terminology has changed from 'adult periodontitis' to 'chronic periodontitis' as this marks the increased international awareness that periodontitis is not just confined to adults over the age of 35 years, but can begin in early teenage years and progress slowly throughout the teens.[6,7] The destruction resulting from chronic periodontitis is consistent with the microbial aetiology

Table 1 Periodontal classification

Gingival diseases
- Plaque-induced gingivitis
  - Gingival diseases associated with dental plaque only (without/with local factors which predispose to plaque retention)
  - Gingival diseases modified by systemic factors
  - Gingival diseases modified by medications
  - Gingival diseases modified by malnutrition
- Non-plaque induced gingival lesions, including: those of specific bacterial, viral, fungal or genetic origin; lesions of systemic conditions; traumatic lesions or foreign body reactions

Chronic periodontitis (localised or generalised)

Aggressive periodontitis (localised or generalised)

Periodontitis as a manifestation of systemic diseases
- Associated with haematological disorders
- Associated with genetic disorders

Necrotising periodontal diseases
- Necrotising ulcerative gingivitis
- Necrotising ulcerative periodontitis

Abscesses of the periodontium
- Gingival abscess
- Periodontal abscess
- Pericoronal abscess

Periodontitis associated with endodontic lesions

Developmental or acquired deformities and conditions
- Localised tooth-related factors that modify or predispose to plaque-induced gingival diseases/periodontitis
- Mucogingival deformities and conditions around teeth, including gingival recession and gingival overgrowth
- Mucogingival deformities and conditions on edentulous ridges
- Occlusal trauma

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DOI: 10.1038/sj.bdj.2008.301

of the disease in the presence of local risk factors (such as subgingival calculus or plaque-retentive restoration overhangs) and/or systemic risk factors (such as smoking or poorly controlled diabetes mellitus). A diverse microflora containing putative periodontal pathogens can be found in the subgingival plaque biofilm in teenagers.[8,9] Indeed, *Tannerella forsythensis* has been strongly associated with loss of attachment and the conversion of periodontally healthy sites to diseased sites over a three year period in adolescents.[10]

Aggressive periodontitis

Replacement of the previous term 'early onset periodontitis' by 'aggressive periodontitis' helps to depict a rapidly destructive disease without undue emphasis on the age of presentation, albeit a disease that 'normally' but not exclusively affects those young adults under the age of 30 years. It is a distinct and separate entity from chronic periodontitis and must be managed accordingly. Common features of aggressive periodontitis are:

- Patients clinically healthy (apart from the presence of periodontitis)
- Rapid loss of attachment and bone destruction
- Familial aggregation.

The localised form affects incisors and first molars and can present around puberty. Amounts of microbial deposits may be inconsistent with the severity of periodontal destruction and other secondary features may include increased proportions of *Aggregatibacter* (previously *Actinobacillus*) *actinomycetemcomitans* (and possibly *Porphyromonas gingivalis*), phagocyte abnormalities and a hyper-responsive macrophage phenotype. A robust serum antibody response to *A. actinomycetemcomitans* is characteristic and neutrophil defects may have a role in the aetiology. The disease has a multifactorial nature, including a genetic element. Usually less than 1% of the population is affected, but an increased prevalence occurs in African and black ethnic groups. Recently, the JP2 clone of *A. actinomycetemcomitans* has been shown to be an important aetiological agent in the initiation of aggressive periodontitis in an adolescent Moroccan population.[11] Early detection and treatment improves prognosis.

Table 2 Younger patients who may need referral to a specialist

Diagnosis of aggressive periodontitis
Incipient chronic periodontitis not responding to non-surgical therapy performed by the practice team
Systemic medical conditions associated with periodontal destruction
Medical history that significantly affects periodontal care or requiring multi-disciplinary care
Genetic conditions predisposing to periodontal destruction
Root morphology adversely affecting prognosis
Non-plaque-induced gingival or periodontal conditions requiring complex or specialist management
Cases requiring diagnosis of rare/complex clinical pathology
Drug-induced gingival overgrowth
Cases requiring evaluation for periodontal surgery

Detection of periodontal diseases in younger age groups

The basic periodontal examination has been advocated to screen for periodontal diseases in adults[12] but at present there are no universally agreed guidelines for periodontal screening of the younger age groups. However, a simplified screening system for the under-18s as described by Clerehugh and colleagues is quick and easy to use in practice.[5,13] It involves assessing index teeth (UR6, UR1, UL6, LL6, LL1 and LR6) using a WHO 621 probe with a 0.5 mm ball end and black band at 3.5 to 5.5 mm using BPE codes 0-2 in 7- to 11-year-olds and the full range of codes 0, 1, 2, 3, 4 and * in 12- to 17-year-olds (Figs 1 and 2). Currently, the British Society of Periodontology and the British Society of Paediatric Dentistry are working on a joint initiative with the aim of formulating and disseminating periodontal guidelines in the younger age groups.

Management

Periodontal management follows the principles of initial (cause-related) therapy, corrective therapy (definitive treatment plan produced) and supportive

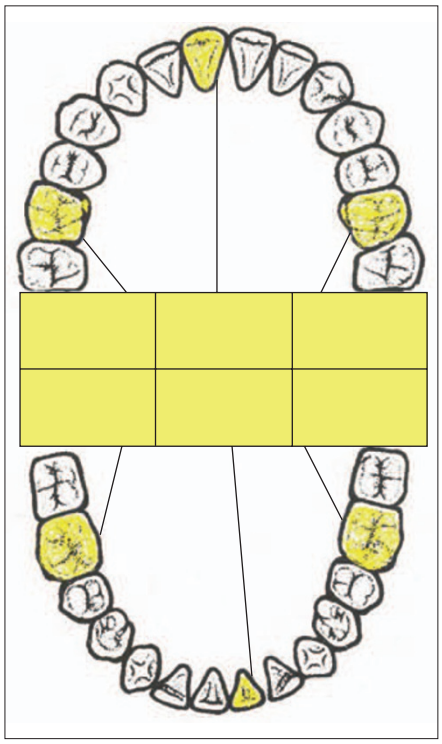
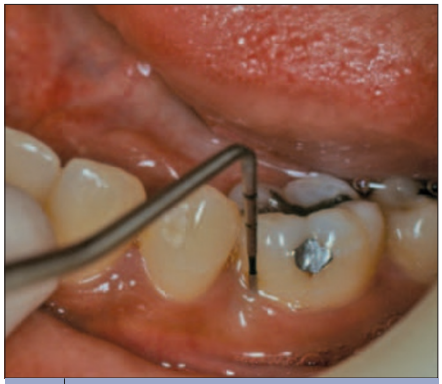


Fig. 1 Index teeth UR6, UR1, UL6, LL6, LL1, LR6 and grid for recording simplified BPE in the under-18s



BPE code	Criteria
0	Healthy periodontal tissues No bleeding after gentle probing
1	Bleeding after gentle probing Black band remains completely visible above gingival margin No calculus or defective margins detected
2	Supragingival and/or subgingival calculus and/or other plaque retention factor Black band remains completely visible above gingival margin
3	Shallow pocket (4 mm or 5 mm) Black band partially visible in the deepest pocket on the index tooth
4	Deep pocket (6 mm or more) Black band disappears in the pocket
*	Furcation involvement Recession + probing depth = 7 mm or more

Fig. 2 WHO 621 probe being used to undertake simplified BPE on LL6 index tooth; BPE codes

(maintenance) therapy with appropriate recall based on the diagnosis. Effective control of the plaque biofilm and preventive measures are fundamental to success. Child-centred approaches to behavioural management should be implemented as necessary.[14] Much of the treatment can be carried out in the dental practice setting, but the decision to treat or refer to a specialist (Table 2) includes consideration of:

- General dental practitioner's expertise
- Patient-centred factors
- Complexity of case.

In conclusion, many different forms of periodontal disease, some very destructive, can manifest in younger age groups but early diagnosis and treatment improves prognosis. Work is ongoing to produce guidelines for periodontal screening and management of the under-18s.

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