



Emma Cole

Arijit Ray-Chaudhuri, Mina Vaidyanathan, Joanna Johnson and Sanjeev Sood

# Simplified Basic Periodontal Examination (BPE) in Children and Adolescents: A Guide for General Dental Practitioners

**Abstract:** Dental plaque-induced periodontal diseases are common in children and adults. Guidelines were previously not available for the periodontal screening of under 18s. However, new guidelines have been introduced by the British Society of Periodontology and the British Society of Paediatric Dentistry which set out recommendations for the periodontal screening and management of under 18s in primary dental care. This article provides a practical guide for general dental practitioners on how to use the BPE in children and adolescents, and highlights the importance of early detection and management of periodontal diseases in this age group. A failure to use the modified BPE in a young patient who is later diagnosed with periodontitis may leave a dentist vulnerable to a medico-legal complaint or claim.

**Clinical Relevance:** New BPE guidelines for children and adolescents have been introduced by the BSPD and BSP; it is important that all dentists are aware of these guidelines and how to implement them in general practice.

**Dent Update 2014; 41: 328–337**

**Emma Cole**, BDS, MJDF RCS(Eng), Specialty Registrar in Paediatric Dentistry, Health Education Kent, Surrey and Sussex, **Arijit Ray-Chaudhuri**, BDS, MFDS RCS(Ed), MJDF RCS(Eng), LLM AHEA, FDS RCS (Eng), Consultant in Restorative Dentistry, Brighton and Sussex University Hospitals NHS Trust, **Mina Vaidyanathan**, BDS, BSc(Hons), MFDS RCS(Ed), MSc MPaedent FDS(Paed), Consultant in Paediatric Dentistry, Guy's and St Thomas' NHS Foundation Trust, **Joanna Johnson**, BDS, MFDS RCS(Eng), MSc MPaedDent FDS(Paed), Consultant in Paediatric Dentistry Guy's and St Thomas' NHS Foundation Trust and **Sanjeev Sood**, BDS, MFDS RCS(Ed), MDentCh FDS RCS(Eng), Consultant in Paediatric Dentistry, King's College Dental Hospital, London, UK.

Dental plaque-induced periodontal diseases are common in both children and adults.<sup>1</sup> Plaque-induced periodontal diseases have two common manifestations, gingivitis and periodontitis. Gingivitis is a reversible disease and can be defined as the presence of gingival inflammation without loss of connective tissue attachment.<sup>2</sup> Periodontitis can be defined as the presence of gingival inflammation at sites where there has been a pathological detachment of collagen fibres from cementum and the junctional epithelium has migrated apically.<sup>2</sup> It is considered that gingivitis and periodontitis are a continuum of the same disease, however, there is a wide range in an individual's susceptibility and thus not all patients with gingivitis will progress to periodontitis.<sup>3,4</sup>

The Child Dental Health Survey 2003<sup>1</sup> showed that, in three of the four

age groups (5, 8, 12 years of age), levels of gingival inflammation and plaque accumulation had increased since the previous survey in 1993.<sup>5</sup> However, the level of gingivitis for 15-year-olds remained similar to previous surveys, with 43% of 15-year-olds demonstrating gingivitis.<sup>1</sup> This survey did not examine periodontal pocketing and thus levels of periodontitis were not measured. However, a study by Clerehugh *et al* found that 3% of 14-year-olds had attachment loss of at least 1 mm on at least one of the incisors, molars and premolars. The prevalence of attachment loss rose to 37% at age 16 and 77% at 19.<sup>6</sup>

Thus screening children for periodontal diseases is very important. In the UK the BPE has been a well recognized tool for screening adults for periodontal diseases. Following the

publication of the new joint guidelines by the British Society of Periodontology (BSP) and the British Society of Paediatric Dentistry (BSPD), its use is now recommended in both adults and children.<sup>7</sup>

The aim of this article is to provide a practical guide for GDPs on how to use the BPE in children and adolescents. This article also highlights the importance of early detection and management of periodontal diseases in this age group.

### The Basic Periodontal Examination (BPE)

The BPE was introduced by the BSP in 1986 to act as a simple and rapid tool to help dentists to screen for periodontal diseases in adults. A study by Tugnait *et al* in 2004 found that its use had been adopted by the majority of GDPs during both new patient and recall examinations; reported use being 91% and 84% of the time, respectively.<sup>8</sup> It is an important tool to help identify the early signs of periodontitis and prevent its sequelae and its use is recommended by some indemnity organizations to help clinicians to record periodontal health or disease.<sup>9</sup> A lack of its use by a clinician may leave him/her vulnerable to a complaint or an allegation of negligence in failure to diagnose periodontal disease.

### The new Basic Periodontal Examination

In 2011, the BSP introduced modifications to the use of the BPE. The asterisk code now only represents furcation involvement and not clinical attachment loss of 7 mm or greater as before (Figure 1, Table 1). This asterisk code also needs to be used in conjunction with a numerical code, eg if teeth in a sextant have pocketing of 6 mm and furcation involvement, the code would now be recorded as a 4\*.

In addition to this, new guidelines have been introduced by the BSP and the BSPD<sup>7</sup> which set out recommendations for the periodontal screening and management of children and adolescents under the age of 18 years in primary dental care. Unlike in

adults, there was a lack of clear guidance for the assessment of periodontal diseases in children prior to this.

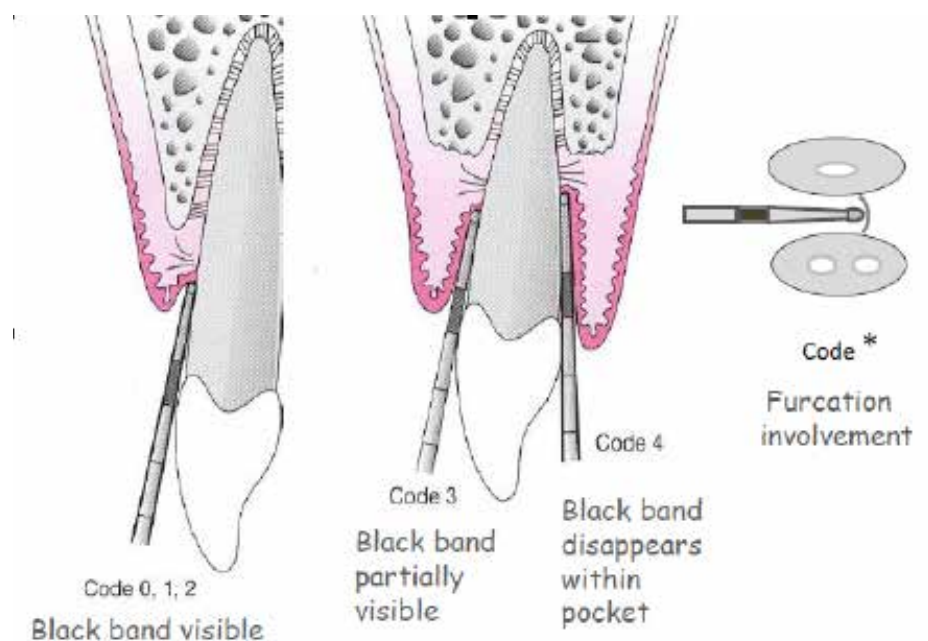
The aim of these new guidelines and the simplified BPE is to provide a quick, simple and acceptable method of screening patients for periodontal conditions that is sufficient to identify those who would benefit from a more detailed examination. The index teeth have been chosen as it is uncommon for periodontal breakdown to be found at other sites without these teeth being affected. Examination of these teeth allows the detection of both reversible and irreversible periodontal diseases.

Although this examination is appropriate for the majority of patients, for those with extreme dental anxiety or

diminished understanding, it may not be appropriate.

### How to use the BPE in children and adolescents

A simplified BPE is recommended for use in children (Figure 2). This involves assessing six index teeth UR6, UR1, UL6, LL6, LL1, LR6. The BPE should be performed using the WHO 621 probe with a light probing force of between 20 and 25 grams. The probe has a 0.5 mm sphere on its tip and a black band between 3.5 and 5.5mm. This is used to differentiate between a healthy sulcus depth (less than 3.5 mm) and a pathological periodontal pocket (3.5 mm or greater). The BPE codes shown



**Figure 1.** A diagram to demonstrate the use of the WHO probe and the current BPE codes.

Code 0	Healthy
Code 1	Bleeding on probing. No plaque retention factors or pockets greater than 3.5 mm
Code 2	Presence of calculus or plaque retention factor. No pockets greater than 3.5 mm
Code 3	Pockets of 3.5 to 5.5 mm
Code 4	Pockets greater than 5.5 mm
*	Furcation involvement

**Table 1.** The new BPE codes for use in children and adults (2011).

in Table 1 apply to both child and adult patients.

The type of assessment required varies with the age of the patient. As for all adult patients, children should have a thorough extra-oral examination and an intra-oral assessment, to include examination of the soft and hard tissues in addition to an examination of the periodontal condition. This should include a description of the gingival colour, presence and location of swelling, inflammation, recession and suppuration (Figure 3). The oral hygiene should be assessed and any visible calculus deposits recorded.

**Children under 7 years of age**

A BPE is not necessary in this age group as periodontal problems are rare and index teeth are frequently unerupted. Children who demonstrate unexplained mobility or premature exfoliation of teeth or erythematous, swollen gingivae and/or suppuration for which no other dental cause can be found should be referred for specialist opinion. As in older children and adults, periodontal breakdown may be a manifestation of systemic diseases (Figures 4, 5)<sup>10</sup> (Table 2).

**Children 7–11 years of age**

In this age group the index teeth should be examined for bleeding on probing, calculus and plaque retention factors only. Thus only BPE codes of 0, 1 and 2 may be used in this age group. It is not necessary to examine for pathological periodontal pockets as false pockets are common around partially erupted teeth and true periodontal pockets are uncommon in this age group.<sup>11</sup> As mentioned previously, children who demonstrate unexplained mobility or premature exfoliation of teeth or erythematous, swollen gingivae and/or suppuration for which no other dental cause can be found should be referred for specialist opinion.

**Children and young adults 12–17 years of age**

The full BPE should be performed on the index teeth in this age group.

**Orthodontic patients**

A BPE on the index teeth should

be provided for all children and young adults with fully erupted index teeth prior to referral for orthodontic treatment.

It is the shared responsibility of the orthodontist and GDP to monitor the health of the teeth and periodontium during orthodontic treatment.

**Short-term management**

**Clinical examination and treatment**

The codes generated by a BPE not only allow screening for periodontal diseases but they also provide recommendations for its management, including advice, treatment and recall periods.

The BSP and BSPD recommend that the following BPE codes are likely to require the associated management:

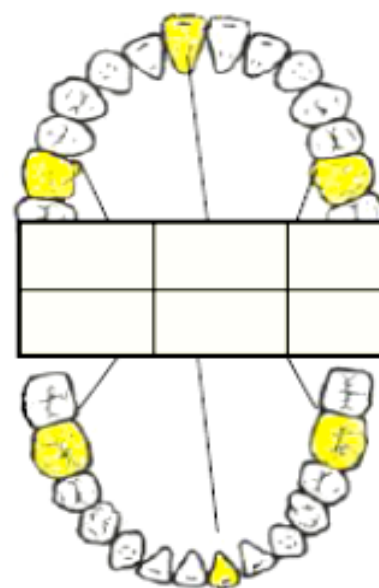
**Code 0:** No treatment is recommended. Routine preventive advice should be provided and the patient screened again at his/her routine recall visit or within one year, whichever is sooner.

**Code 1:** Oral hygiene instruction and prophylaxis is recommended. The patient should be screened again at routine recall visit or within six months, whichever is sooner.

**Code 2:** Scaling is recommended in addition to the removal of other local plaque-retentive factors, eg over-contoured restorations. Oral hygiene instruction and prophylaxis is also advised and the patient should be screened again at his/her routine recall appointment or after six months, whichever is sooner.

**Code 3:** Full probing depths should be recorded for the index teeth (six sites per tooth) and all other teeth in the sextant should be checked. Radiographs may be required. Treatment recommended involves oral hygiene instruction, supra-gingival and sub-gingival scaling and removal of plaque retention factors. Root surface debridement may also be indicated followed by a review appointment after three months.

**Codes 4 and \*** are unusual in young patients and full periodontal assessment is indicated with a thorough assessment of the patient's risk factors, eg medical history of systemic conditions, family history of aggressive periodontitis,



**Figure 2.** A diagram to demonstrate how to use the modified BPE to assess the index teeth (UR6, UR1, UL6, LL6, LL1 and LR6).



**Figure 3.** A lower right first permanent molar (LR6) in a patient with localized aggressive periodontitis illustrating buccal clinical attachment loss and suppuration.

Neutropenia
Leukaemia
Down syndrome
Leukocyte adhesion deficiency syndromes
Ehlers-Danlos syndrome
Papillon-Lefèvre syndrome
Infantile Genetic Agranulocytosis
Chediak-Higashi
Histiocytosis syndromes
Glycogen Storage Disease
Cohen syndrome
Hypophosphatasia

**Table 2.** Systemic conditions that may be associated with periodontal breakdown

social history including smoking etc. Referral to a specialist in periodontics or paediatric dentistry should also be considered.

**Radiographs**

Radiographs should be considered for all BPE codes of 3, 4 or \*. Horizontal or vertical bitewings are useful for assessing the posterior teeth, vertical bitewings may be indicated where BPE codes of 4 or \* are found in order that the alveolar crest is visualized. Alternatively, when pathology is suspected on multiple teeth, a DPT may be indicated.<sup>12</sup> Selected long cone periapical radiographs can be used to assess the anterior teeth. In addition, when taking any dental radiographs in children or adolescents, the opportunity should be taken to assess the alveolar bone level. In the permanent dentition the bony crest should lie between 0.4 and 1.9 mm from the cemento-enamel junction.<sup>13</sup> This distance can be greater than 2 mm in the primary dentition, in some cases of normal facial growth and with the loss of adjacent teeth.

**Referral**

Referral to a periodontist or paediatric dentist should be considered in the following instances:

- BPE Codes 4 and \* are detected, particularly if accompanied by bleeding, suppuration or mobility of teeth;
  - Chronic periodontitis not responding to treatment;
  - Aggressive periodontitis (Figure 6);
  - Systemic medical condition associated with periodontal destruction;
  - Genetic conditions predisposing to periodontal destruction;
  - A medical history that significantly affects periodontal treatment or requiring multidisciplinary care;
  - Drug-induced gingival overgrowth;
- Patients requiring diagnosis/management of rare/complex clinical pathology;
- Root morphology adversely affecting prognosis.

**Long-term management**

The primary aim of the long-term management of affected young patients is to maintain periodontal stability and thus prevent irreversible bone loss and

its sequelae, eg increased tooth mobility, 'black triangle disease' and potential tooth loss (Figures 7, 8).

If tooth loss does occur, young patients often seek prosthodontic replacement with or without prior orthodontic treatment. Orthodontics alone is rarely the treatment of choice if tooth loss has occurred, but is ideal for managing teeth that have migrated. However, the management of these patients is often difficult and, despite prolonged treatment, may still lead to a suboptimal functional and cosmetic result (Figures 9, 10). Thus optimal oral rehabilitation of patients who have suffered significant periodontal destruction at a young age often requires multidisciplinary care which always includes a primary care practitioner and may include experts in the fields of periodontics, prosthodontics, implantology, oral surgery, paediatric dentistry and orthodontics.

If orthodontics is indicated then the patient should be periodontally stable prior to treatment as orthodontic forces applied to teeth with ongoing periodontitis may act as a co-destructive factor and lead to increased bone loss.<sup>14</sup> It is unclear as to the minimum time interval between active periodontal therapy and orthodontic treatment but the authors suggest a minimum of one year. If there is



**Figure 4.** A 3-year-old child suffering with hypophosphatasia demonstrating the premature loss of multiple primary teeth.



**Figure 5.** A young patient suffering with Coffin–Lowry syndrome demonstrating the early loss of multiple primary teeth. Coffin-Lowry syndrome is a rare genetic disorder associated with psychomotor retardation, short stature, skeletal and digit abnormalities, thick lips, high palate, microdontia, hypodontia, delayed eruption and early tooth loss.



**Figure 6.** An orthopantomogram of a 14-year-old patient with localized aggressive periodontitis with advanced bone loss affecting UR126, LR126 and LL126.

any doubt regarding the patient's stability or motivation to maintain excellent oral hygiene during orthodontics, then it should not be recommended.

Unfortunately, the use of fixed orthodontic appliances has been found to increase plaque accumulation<sup>14</sup> and orthodontic treatment in general causes a small but significant detrimental effect on periodontal health.<sup>15</sup> Thus a patient who was previously stable for a significant period of time may find that he/she develops recurrent periodontitis as a result of this treatment. Even if the patient maintains good periodontal health during treatment, controlling orthodontic forces on teeth with reduced but healthy attachment apparatus is difficult and usually requires an experienced orthodontist.<sup>16</sup>

Prosthetic replacement of lost anterior teeth is often required in addition to, or instead of, orthodontics. This also has notable difficulties as young patients are often averse to wearing a removable prosthesis. Even when a removable prosthodontic solution is acceptable to a patient, the evidence suggests that greater plaque accumulation may occur in both the restored and the opposing arches.<sup>17</sup> This creates a downward spiral in which the patient becomes increasingly dependent on a prosthesis which is expediting the loss of the remaining teeth.

As the majority of young patients have a minimally restored anterior dentition, the prescription of conventional bridges is rarely warranted. Adhesive bridges are often suitable for the prosthodontic rehabilitation of affected young patients as long as the abutment teeth have sufficient remaining tooth structure and periodontal support. Using a healthy but periodontally compromised tooth as a bridge abutment may subject the tooth to secondary occlusal trauma and may cause the tooth to have increased long-term mobility.

Dental implants can provide an alternative fixed prosthodontic solution for patients with missing anterior teeth. For an implant fixture to osseointegrate successfully, it ideally requires complete three-dimensional coverage with alveolar bone. The very nature of periodontitis, however, means that bone has been lost, especially at the most coronal aspects



**Figure 7.** A young adult patient with previous localized aggressive periodontitis and 'black triangle disease'.



**Figure 8.** The same patient as in Figure 7 with a gingival veneer to provide prosthetic camouflage of her 'black triangle disease'.



**Figure 9.** The same patient as in Figure 6 aged 18 years of age. The patient has recently lost her UR2, LR1, LL1 and LL2.

of the alveolar crest. Thus periodontally compromised sites often require bone and soft tissue augmentation which adds to the complexity, expense, time and expertise required to obtain a satisfactory result. Even when an implant-retained restoration is possible, the lack of crestal bone often means that recreation of the dental papillae is unpredictable (Figure 11). Another concern in implant rehabilitation in the aesthetic zone relates to the timing for the placement of any fixtures. It is well established that vertical alveolar growth in adolescents may continue long after maximum height has been established. Placement of an implant fixture prior to completion of vertical alveolar growth may lead to an unsightly discrepancy between the implant-retained crown and the remaining teeth (Figure 12). In a patient with a high smile line this is likely to be noticeable but is difficult or impossible to



**Figure 10.** A suboptimal final cosmetic result in the patient described in Figures 6 and 9. The patient was treated with orthodontics to close a space created by the exfoliation of UR2 and removable partial dentures replaced LR2, LR1, LL1 and LL2. Note that the midline of the upper teeth has been moved to the patient's right and is not coincident with the midline of the face.



**Figure 11.** A patient with two dental implants placed to replace the lost upper central incisors. Note the lack of a midline interdental papilla which is highly visible.



**Figure 12.** A patient with two dental implants placed when he was a young adult to replace the lost upper central incisors. Note the discrepancy between the incisal edges of the implant-retained restorations and the incisal edges of the lateral incisors. This is due to late anterior alveolar growth.

correct post-operatively.

Unfortunately, even if implants are optimally placed, they are known to have an increased rate of failure in patients who are susceptible to periodontitis.<sup>18</sup> Indeed, implants suffer marginal soft tissue inflammation and peripheral bone loss which has a similar clinical presentation to the effects of gingivitis and periodontitis in teeth. The disease processes are termed

peri-implant mucositis and peri-implantitis, respectively, and can be very difficult to manage once established.

If posterior teeth are lost due to periodontal disease then no prosthodontic replacement is often proposed. It is well recognized that patients can maintain oral function with a shortened dental arch and occluding units in the anterior and premolar teeth only.<sup>19,20</sup> If the patient desires prosthodontic replacement of teeth, the fixed or removable options outlined above may be indicated. If the patient is periodontally stable and has heavily restored teeth adjacent to the edentulous space, then a conventional bridge may be considered.

Finally, in addition to avoiding or mitigating the effects of tooth loss, it has been postulated that improving patients' periodontal health may have a beneficial effect on their systemic health. Recent high quality evidence indicates that improving a diabetic patient's periodontal health may improve his/her glycaemic control.<sup>21</sup> It has also been hypothesized that improving periodontal health leads to a reduction in a patient's long-term risk of cardiovascular diseases,<sup>22</sup> rheumatic disease<sup>23</sup> and adverse pregnancy outcomes.<sup>24</sup> At present, however, there is little conclusive evidence that elucidates the exact nature and causality of any links and how this may relate to periodontal diseases in younger patients.

## A medico-legal perspective

It is well established that the number of complaints and legal claims made against dentists in the UK has risen steadily for several decades. Periodontology as a whole has been recognized as one of the higher risk areas in dentistry and the consequences of a failure to diagnose irreversible periodontal destruction can be severe for the patient and the dentist.<sup>25</sup>

For any plaintiff to be successful in proving that a defendant is negligent he/she must establish three broad facts. It needs to be shown, on the balance of probabilities, that the defendant:

1. Had a duty of care. When there is a dentist-patient relationship this is usually unproblematic to establish. If the patient is under the care of multiple dentists, however, this may be more complex.
2. Breached that duty of care. This is where

the Bolam test would apply,<sup>26</sup> ie is there a recognized standard against which the dentist could be judged? In the future it may become the new BPE and thus a failure to provide this may be seen to be a failure to reach that accepted standard. Conversely, providing a BPE, accurate diagnosis and management advice would allow a very robust defence to this allegation.

3. Caused a foreseeable harm. In the case of an irreversible periodontal disease this is likely to be tooth loss and its sequelae. It is left to the defendant to prove that this would have happened regardless of any failure to diagnose, eg if the patient was a heavy smoker, was immuno-compromised, had an especially aggressive form of periodontitis, etc.

A plaintiff usually has a time limit of three years in which to begin a claim in negligence under the Limitation Act. The earliest that this time bar begins for any claimant is from the time that he/she legally becomes an adult, which in the UK is 18 years of age. In addition, the time does not start to run from the date of the alleged breach of duty, ie failure to diagnose an irreversible periodontal disease. The time begins when the patient becomes aware of the problem, eg a periodontal assessment at a new dentist, or should have become aware of the problem, eg loose teeth.

Further to all of this, if the patient is seen under an independent contract, then instead of suing a dentist in negligence they can claim for a breach of contract. Under the Act, claims in breach of contract have a six year time bar rather than three years for claims in negligence. A patient cannot claim breach of contract if the patient is a registered NHS patient as no direct contract exists between the two parties.

Thus a dentist may find that a claim of failure to diagnose periodontitis may materialize many years or even decades after the alleged negligence.

Finally, if a dentist is found to have been negligent in failing to diagnose periodontitis in a child then the quantum of damages is also likely to be higher than for an older adult patient. This is because any damages that are awarded will have to take into account the cost of tooth replacement and subsequent maintenance

and failure of those replacements over the remainder of the patient's life.

## Conclusion

The BPE has now been modified for use in children. This should be used as described to identify children at risk of periodontal diseases, to act as a guide for appropriate management and to identify patients who may benefit from referral to a specialist in paediatric dentistry or periodontics.

This article provides a summary of the new guidelines released by the BSP and BSPD and explains the use of a modified BPE in children. This article also highlights the importance of providing appropriate clinical and radiographic examinations and outlines the difficulties in returning a patient to ideal function and cosmetics once irreversible damage has occurred.

Finally, failure to use the modified BPE in a young patient who is later diagnosed with periodontitis may leave a dentist vulnerable to a medico-legal complaint or claim.

## References

1. Office for National Statistics. Children's Dental Health Survey, 2003. ([www.ons.gov.uk](http://www.ons.gov.uk))
2. Armitage GC. Clinical evaluation of periodontal diseases. *Periodontology 2000* 1995; **7**: 39–53.
3. Clerehugh V. Periodontal diseases in children and adolescents. *Br Dent J* 2008; **204**: 469–471.
4. Loe H, Anerud A, Boysen H, Morrison E. Natural history of periodontal disease in man. Rapid, moderate and no loss of attachment in Sri Lankan laborers 14 to 46 years of age. *J Clin Periodont* 1986; **13**: 431–440.
5. Office for National Statistics. Children's Dental Health Survey, 1993. ([www.ons.gov.uk](http://www.ons.gov.uk))
6. Clerehugh V, Lennon MA, Worthington HV. Five-year results of a longitudinal study of early periodontitis in 14 to 19-year-old adolescents. *J Clin Periodont* 1990; **17**: 702–708.
7. Clerehugh V, Kindelan S. *Guidelines for Periodontal Screening and Management of Children and Adolescents under 18 Years of Age*. British Society of Periodontology and The British Society of Paediatric Dentistry, 2012. ([www.bsperio.org.uk](http://www.bsperio.org.uk))
8. Tugnait A, Clerehugh V, Hirschmann P. Use of the basic periodontal examination and radiographs in the assessment of periodontal

- diseases in general dental practice. *J Dent* 2004; **32**: 17–25.
9. Dental protection. Exercises in risk management periodontal monitoring. ([www.dentalprotection.org](http://www.dentalprotection.org))
  10. Kinane D. Periodontitis modified by systemic factors. *Ann Periodont* 1999; **4**: 54.
  11. Ainamo J, Nordblad A, Kallio P. Use of the CPITN in populations under 20 years of age. *Int Dent J* 1984; **34**: 285–291.
  12. Pendlebury M, Horner K, Eaton K, eds. *FGDP(UK) Good Practice Guidelines: Selection Criteria for Dental Radiography* 2nd edn. London: Faculty of General Dental Practitioners (UK), The Royal College of Surgeons of England, 2004.
  13. Hausmann E, Allen K, Clerehugh V. What alveolar crest level on a bitewing radiograph represents bone loss? *J Periodont* 1991; **62**: 570–572.
  14. Turkkahraman H, Sayin MO, Bozkurt FY *et al*. Archwire ligation techniques, microbial colonization, and periodontal status in orthodontically treated patients. *Angle Orthod* 2005; **75**: 231–236.
  15. Bollen A, Cunha-Cruz J, Bakko D *et al*. The effects of orthodontic therapy on periodontal health: a systematic review of controlled evidence. *J Am Dent Assoc* 2008; **139**: 413–422.
  16. Gkantidis N, Christou P, Topouzelis N. The orthodontic–periodontic interrelationship in integrated treatment challenges: a systematic review. *J Oral Rehab* 2010; **37**: 377–390.
  17. Addy M, Bates J. Plaque accumulation following the wearing of different types of removable partial dentures. *J Oral Rehab* 1979; **6**: 111–117.
  18. Safii S, Palmer R, Wilson R. Risk of implant failure and marginal bone loss in subjects with a history of periodontitis: a systematic review and meta-analysis. *Clin Implant Dent Rel Res* 2010; **12**(3): 165–174.
  19. Kayser A. Shortened dental arches and oral function. *J Oral Rehab* 1981; **8**: 457–462.
  20. Witter D, De Haan A, Kayser A, Vanrossum G. A 6-year follow-up study of oral function in shortened dental arches. Part II: Craniomandibular dysfunction and oral comfort. *J Oral Rehab* 1994; **21**: 353–366.
  21. Simpson TC, Needleman I, Wild SH, Moles DR, Mills EJ. Treatment of periodontal disease for glycaemic control in people with diabetes. *Cochrane Database of Systematic Reviews* 2010, Issue 5.
  22. Friedewald V, Kornman K, Beck J *et al*. The American Journal of Cardiology and Journal of Periodontology Editors' Consensus: Periodontitis and atherosclerotic cardiovascular diseases. *J Periodont* 2009; **80**: 1021–1032.
  23. Pablo P, Chapple I, Buckley C, Dietrich T. Periodontitis in systemic rheumatic diseases. *Nature Rev Rheumatol* 2009; **5**: 218–224.
  24. Polyzos N, Polyzos I, Mauri D *et al*. Effect of periodontal disease treatment during pregnancy on preterm birth incidence: a metaanalysis of randomized trials. *Am J Obstet Gynecol* 2009; **3**: 225–232.
  25. Baker P, Needleman I. Risk management in clinical practice. Part 10. Periodontology. *Br Dent J* 2010; **209**(11): 557–565.
  26. Zinman E. Dental and legal considerations in periodontal therapy. *Periodontology* 2000 2001; **25**: 114–130.

## Specialist oral care

As a complement to ordinary toothbrushes, TePe offers a wide range of special brushes adapted to patient groups with specific oral hygiene needs. All our products are developed in conjunction with dental experts.

### 1. TePe Implant/Orthodontic Brush

- Extra-narrow brush head and thin neck facilitates access and cleaning close to implants and orthodontic wires
- Soft, end-rounded filaments in two rows, gentle on appliances and restorations

### 2. TePe Interdental Brushes

- Nine colour-coded sizes
- Plastic-coated wire

### 3. TePe Angle™

- Angled brush head for optimal reach
- Ergonomic handle for easy cleaning
- Six colour-coded sizes

### 4. TePe Implant Care™

- Unique angle for improved access
- Soft, end-rounded filaments for comfort
- Suitable for fixed prostheses and soft tissue cleaning



For more information call 01934 710022, email [infoUK@tepe.com](mailto:infoUK@tepe.com) or search the web: 'TePe UK'