


REPORT

Age-related effects on oral health, caries and gum disease

Highlights of Perio Workshop 2016 on
the boundaries between dental caries
and periodontal diseases - jointly
organised by the EFP and ORCA

Compiled by **Prof Nicola West** from the
consensus reports chaired by **Prof Mariano
Sanz, Prof Søren Jepsen, Prof Iain Chapple,**
and **Prof Maurizio Tonetti**

The logo for 'Perio & Caries', featuring a stylized blue 'C' shape on the left and the text 'Perio & Caries' in a bold, blue, sans-serif font on the right.

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Periodontology

REPORT

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Compiled by **Prof Nicola West** from the consensus reports chaired by **Prof Mariano Sanz**, **Prof Søren Jepsen**, **Prof Iain Chapple**, and **Prof Maurizio Tonetti**

Key

- * ***Perio Workshop 2016 - working group 2:***
Interaction of lifestyle, behaviour or systemic diseases with dental caries and periodontal diseases
- ** ***Perio Workshop 2016 - working group 3:***
Prevention and control of dental caries and periodontal diseases at individual and population level
- *** ***Perio Workshop 2016 - working group 4:***
Dental caries and periodontal diseases in the ageing population: call to action to protect and enhance oral health and well-being as an essential component of healthy ageing

Relationship between **caries** and **gum disease**

Introduction

Periodontal diseases and dental caries are the most common non-communicable diseases of mankind and the main cause of tooth loss. Both diseases can lead to nutritional compromise and negative impacts upon self-esteem and quality of life. The dental biofilm is a major biological determinant common to the development of both diseases, and both diseases share common risk factors and social determinants, important for their prevention and control.

All the oral healthcare team members have a role to play in educating and motivating patients to reduce intake of free sugars, to practice proper dental plaque control and encourage smoking cessation.

There are also a number of groups of healthcare professionals who need to know more about these diseases and understand the on-going balance between risk factors (e.g. smoking), protective factors (e.g. fluoride in dental caries, high levels of oral hygiene in periodontal diseases) and pathological factors. This group of healthcare workers includes physicians (general practitioners, geriatricians), nurses (public health nurses, oncology and geriatric settings), pharmacists (from the standpoint of a general awareness of the cariogenicity associated with salivary depletion as well as an awareness of the dangers of medicines with added sugar, and the importance of smoking cessation to periodontal diseases), dietitians including all those involved with diet and nutrition.

Effective preventive and therapeutic interventions are available to manage both dental caries and periodontal diseases. Over the last two decades, progress in prevention and treatment of dental caries and periodontal diseases has been translated to better oral health however, with the ageing population and the increasing expectations of good oral health-related quality of life in older age, this poses formidable challenges to clinical care and healthcare systems.

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Perio & Caries project - its key messages

1. Caries & periodontal disease most common human diseases but are preventable.
2. Benefits of tooth retention impact is on nutritional status, speech, self-confidence, and quality of life.
3. Burden of these diseases is increasing as the population ages.
4. We should be assessing dependence and frailty rather than chronological age per se.
5. Periodontal disease is associated with general health issues raising need to integrate professions.
6. The oral healthcare team need to consider advising on weight loss, smoking cessation, exercise, and controlling diabetes and glycaemia in general.
7. Reducing sugar and starch intake in amount and frequency is important to periodontal disease as well as caries – limit to mealtimes.
8. Bleeding gums are NOT normal and patients should be referred for oral health screening.
9. Educational programmes should target mothers to be, new mothers, care home workers and other groups who care for those with dependence.
10. Risk assessment using validated tools should be routine in dental practice to drive individualised preventive care.
11. Periodontal disease should be a sign post to other general health issues.
12. Brushing twice daily with FI toothpaste is essential and can also be supplemented with chemical agents.
13. Remuneration approaches for dental professionals should reward prevention.
14. Dental check-ups should be provided free at key touch points across the life course – 2, 5, 12, 26, 40 and 70 years of age.
15. Store tooth brushes separately in bathrooms to avoid horizontal transmission of potential pathogens.
16. Check saliva levels routinely and consider drug substitution in dry mouth as well as FI applications.

Dental caries

1.1 Information for the oral healthcare team regarding dental caries:

- Data supports the role of a genetic component to dental caries susceptibility.*
- Susceptibility varies substantially throughout the life course,* with elders being more vulnerable.***
- There is an association between lower socio-economic status and higher dental caries risk.**
- Dietary fermentable carbohydrates (sugars, starch) are a necessary component for dental caries initiation and progression.*
- Use toothpastes containing fluoride agents for the control of dental caries.**
- Use professional fluoride application for individuals with a high dental caries risk.**
- Educate and motivate patients to reduce intake of free sugars.*
- Give advice on dietary starch reduction for individuals with root caries.*

1.2 Information for other healthcare professionals regarding dental caries:

- Substitute drugs where reduced salivary flow rate is a complication of a specific medication.*
- Educate and motivate patients to reduce intake of free sugars.*
- Ensure foods and drinks distributed at schools follow the latest health.*
- Recommend toothpastes containing fluoride agents.**

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1.3 Information for patients and for the general public regarding dental caries:

- There is an association between lower socio-economic status and higher dental caries risk.**
- Dietary fermentable carbohydrates (sugars, starch) are a necessary component for dental caries initiation and progression.*
- Use a fluoride toothpaste twice daily.*
- Ask dental professionals to apply fluoride application if you are at high risk of dental caries.**

1.4 Information for public health agencies and policymakers regarding dental caries:

- Agencies and Governments should put in place a locally appropriate combination of aligned upstream, mid-stream and downstream policies and activities aimed at dental prevention and control.*
- Deliver comprehensive implementation of the recent WHO guidelines on sugar consumption and combined with other fluoride-related interventions. Focus on reducing the risk for dental caries initiation and progression across populations and risk groups. For example, in some countries, taxes on sugar and beverages with added sugar are being introduced and show some promise.*
- Educate the public to brush twice daily with a fluoridated toothpaste.
- Incorporate professional tooth cleaning through a structured prophylaxis programme including oral hygiene instruction, motivation, dietary advice and fluoride application in order to be effective in managing dental caries.**

Periodontal diseases

1 Information for the oral healthcare team members for periodontal diseases:

- Data supports the role of a genetic component cause to periodontal diseases modified by lifestyle (acquired) and environmental factors.*
- There is an association between lower socio-economic status and higher prevalence of periodontitis, and prevalence is lower in females than males.**
- Increase awareness of importance of vitamin D and antioxidant micronutrients through natural dietary sources.*
- Recommend that fluoride can be supplemented by adjunctive chemical plaque control agents in the management of gingivitis for the primary prevention of periodontitis.**
- Engage the entire oral healthcare team in smoking cessation advice and support, and refer where necessary to specialist services.*
- Educate, motivate and support patients to practice individualized dental plaque control, oral hygiene instructions being enriched by motivational approaches.**
- Engage in discussions on weight loss.*
- Encourage adherence to glycaemic control regimes in diabetes patients.*

2 Information for other healthcare professionals regarding periodontal diseases:

- Having periodontitis does not necessarily mean that someone has neglected proper oral self-care. Susceptibility varies and the most highly susceptible individuals may acquire the disease even with relatively good oral hygiene.*
- Risk for periodontitis has a strong heritability, but lifestyle and environmental factors and behaviours are key to determining whether disease develops or progresses.*
- Periodontitis should be regarded as a “sign post” condition, that may indicate malnutrition or

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that a patient may have an underlying chronic non-communicable disease (e.g. undiagnosed diabetes) and the advice of a dental care professional should be sought.*

- Bleeding gums are NOT normal and the appearance of blood in saliva following toothbrushing is not normal.*
- Encourage patients with bleeding gums or bad breath or any looseness of teeth, or with gaps appearing between teeth to visit a dental care professional for an examination and diagnosis.*
- Encourage everyone with signs of periodontal disease to clean between their teeth once daily, as directed by a dental care professional.*
- Ensure that patients realise that unhealthy gums can be associated with other general health issues and that the mouth is a vital part of the body and not a separate organ.*
- Educate, motivate and support patients to practice proper dental plaque control.**
- Encourage care workers to seek advice as to how to implement individual oral hygiene in care home residents.*
- Advise on smoking cessation.**

3 Information for patients and for the general public regarding periodontal diseases:

- Bleeding gums are NOT normal and the appearance of blood in saliva following toothbrushing is not normal, and for this a dental care professional should be consulted.*
- If you have bad breath or any looseness of teeth, or gaps appearing between teeth you should visit a dental care professional.*
- Engage in discussions on weight loss.*
- Brush your teeth twice a day.**
- Consider smoking cessation.**
- Supplement fluoride use with adjunctive chemical plaque control agents.**
- Encourage adherence to glycaemic control regimes in diabetes patients.*

4 Information for public health agencies and policymakers regarding periodontal diseases:

- Ensure periodontal screening becomes a mandatory component of the oral health examination and consider mandatory reporting of periodontal screening to appropriate local commissioning bodies.*
- Encourage smoking cessation and glycaemic control in non-diabetes as well as diabetes patients.*
- Develop educational programmes for general nurses and care homes workers.*
- Develop public health campaigns educating the public about gum disease.*
- Lobby to recognize oral health as a vital and integral aspect of general health and wellbeing.*
- Ensure messaging about reducing sugar consumption is applied to gum diseases as well as dental caries, by flagging that sugar causes inflammation.*
- Ensure the entire oral healthcare team recommends smoking cessation advice and support, and engage specialist services.*

Dental caries/periodontal diseases

1 Information for the oral healthcare team members regarding dental caries/periodontal diseases:

- Benefits related to retention of healthy dentitions and mastication go beyond oral health, wellbeing and self-esteem as they foster a healthy diet which is necessary to delay physical decline and loss of independence.***
- Encourage the same standard of prevention and care across the whole age range (whenever possible without consideration of age) to retain natural teeth and dentitions into older age.***

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- Consider level of dependence, rather than chronological age, in order to individualize preventive and treatment approaches in older subjects.***
- Modify dental care where ageing is associated with a change in dependency including medical status, with the aim of retaining a pain-free, functional dentition, using appropriate (minimally invasive, also palliative) treatment strategies.***
- Consider medical aspects when treating oral diseases and collaborate with physicians and other caregivers.***
- Consider mobility needs of elders in the dental practice.***
- Examine intra-oral saliva production/moisture levels and consider fluoride supplements and/or saliva substitutes for patients with reduced salivary flow.*
- Focus on the identification of risk in individuals using validated risk assessment tools and design a regular* individualized risk-based prevention programme for each patient.**
- Provide advice and support for a healthy diet according to national dietary guidelines.*
- Refer to a dietitian or general medical practitioner when necessary.*

2 Information for other healthcare professionals regarding dental caries/periodontal diseases:

- Preservation of a functional dentition into old age is possible and may be associated with better overall quality of life and delayed frailty and dependence.***
- Chewing is an essential function to ensure adequate nutrition and is best preserved with natural teeth. Good oral health and comfort is an integral part of healthy ageing.***
- Epidemiological evidence and analysis of trends in risk factors suggest that the burden of dental caries and periodontal diseases will increase in ageing populations that tend to retain more teeth.***
- Oral health is a critical component of healthy ageing and requires ability in self-care and access to preventive services and treatment.***
- As older subjects become more reliant on the care of others for their daily life activities, so do their needs increase for the preservation of oral health and chewing function.***
- Physical and mental health decline associated with ageing have a great impact on the ability to perform oral self-care, and caregivers need to overcome the barriers to care.***
- Benefits related to retention of healthy dentitions and mastication go beyond oral health, wellbeing and self-esteem as they foster a healthy diet which is necessary to delay physical decline and loss of independence.***
- Consider level of dependence, rather than chronological age, in order to individualize preventive and treatment approaches in older subjects.***
- Encourage all to limit frequency of sugar intake (ideally to mealtimes) and amount of intake* and to practice twice daily toothbrushing.**
- Encourage the use of sugar free drinks, mints and chewing gums.*
- Include oral health into medical preventive programmes, in particular in relation to diabetes, obesity, metabolic syndrome and cardiovascular disease (periodontal diseases).*
- Increase knowledge about the impact of diets high in sugars and low in antioxidant micronutrients on oral health in nursing homes.*

3 Information for patients and for the general public regarding dental caries/periodontal diseases:

- Chewing is an essential function to ensure adequate nutrition and is best preserved with natural teeth.***
- Retaining healthy teeth improves nutritional status, reduces the risk of general health consequences of dental caries and periodontal diseases, helps reduce health inequalities, has significant positive health economic impacts and improves quality of life and general wellbeing.*
- Keeping your teeth is possible as you age and important for eating, speaking, smiling and

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- feeling good about yourself. Teeth are for a lifetime.***
- Develop mechanisms and processes for maintaining the oral health status for residents in all care homes.*
- Look after your teeth and gums. Brush your teeth twice a day with fluoride toothpaste and clean in between your teeth with inter-dental brushes or other oral hygiene products as advised by your dentist.***
- Refrain from frequent consumption of sugary foods and sweet drinks as much as possible and limit their consumption to mealtimes only.***
- Ask your carer for help if you have difficulty in cleaning your teeth and gums.***
- See your dentist/oral care professional for preventive care for tooth decay and gum disease and necessary treatment.***

4 Information for public health agencies and policymakers regarding dental caries/periodontal diseases:

- Epidemiological evidence and analysis of trends in risk factors suggest that the burden of dental caries and periodontal diseases will increase in ageing populations that tend to retain more teeth. This requires urgent action.***
- Good oral health and comfort is an integral part of healthy ageing. Demographic transitions, trends in risk factors and medical comorbidities, better prevention and management of dental caries and periodontal disease earlier in life leading to tooth retention, all point to an urgent need for system wide measures to align policy, practice, education and public information about changing oral health needs for the ageing population.***
- Increased attention to the oral health needs of an ageing population. Preservation of a functional dentition into old age is possible and may be associated with better overall quality of life and delayed frailty and dependence. Specific actions need to be implemented with input from relevant stakeholders and adapted to different health systems.***
- Consider the changing epidemiology and demography as well as the changing needs of older adults while developing and delivering both knowledge- and competence based curricula at undergraduate and postgraduate level and as part of continuing education of oral healthcare professionals.***
- Strengthen knowledge and increase awareness of medical comorbidities and medications relevant to the oral care of older adults.***
- Encourage all care homes to develop mechanisms and processes for maintaining the oral health status of their residents.*
- Embed risk assessment and risk driven care pathways into clinical care.*
- Develop strategies to address oral health inequalities in areas of high socio-economic need.*
- Seek to provide a free dental check-up for key stages in life, using “touch points” such as for example at 70 years of age.*
- Encourage routine sharing of relevant health information with the Oral Healthcare Team being an integral part of medical and social health teams.***
- Increase oral healthcare needs of the ageing population. Specific actions are needed to overcome barriers in the care for vulnerable elders.***
- Integrate assisted daily oral care in the professional profile of caregivers, as well as provide access to dental care.***

Research

- There is an urgent need for epidemiological surveillance of dental caries, periodontal diseases, tooth loss and oral health related quality of life in older populations.
- High quality research needs to be conducted in the elderly, in order to ascertain whether risk

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- factors for periodontal diseases change across the life course.*
- Researchers also need to elucidate strategies for risk factor reduction in frail older people and those living in care homes who lack independence.*
 - Research priorities should be placed on how preventive and therapeutic regimens may preserve oral health, quality of life and nutrition into older age as comorbidities present unique challenge to the delivery of intrinsically efficacious and effective strategies.***

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Perio & Caries, a project based on Perio Workshop 2016

The EFP project 'Perio & Caries' builds on the outcomes of Perio Workshop 2016, devoted to "The boundaries between dental caries and periodontal disease", which was organised in November 2016 by the EFP jointly with ORCA (European Organisation for Caries Research) with the sponsorship of Colgate. Perio Workshop is an annual top scientific meeting discussing state-of-the-art issues related to gum health and gum disease, organised by the EFP in La Granja, Spain under chairmanship of Mariano Sanz.

During Perio Workshop 2016, 75 leading global cariologists and periodontists from the EFP and ORCA reviewed together for the first time the available evidence on the common links between these prevalent oral conditions. There was a special emphasis on the associated causes and risk factors and on aspects of prevention that may influence both periodontal diseases and caries. The conclusions of Perio Workshop 2016 are publicly available in a special open-access supplement of the EFP's *Journal of Clinical Periodontology*.

Caries and periodontal diseases share common genetic, aetiological, and environmental factors, although they follow different trajectories so they have always been considered as very separate entities. Not anymore. The project 'Perio & Caries' is born to disseminate those identified similarities – as well as the distinct characteristics of each entity – and thus recommend clear preventive measures at both individual and population level.

The consensus reports produced by the four working groups of Perio Workshop 2016 examined the role of microbial biofilms; the interaction of lifestyle, behaviour and systemic diseases; prevention and control; and age-related effects – all in relation to both dental caries and periodontal diseases.

Other major conclusions of Perio Workshop 2016 and the 'Perio & Caries' project include:

- Microorganisms associated with both caries and periodontal diseases are metabolically highly specialised and organised as multi-species microbial biofilms.
- The progression of these diseases involves multiple microbial interactions driven by different stressors. With caries, exposure to dietary sugars and the fermentation of organic acids results in increasing proportions of acidogenic and aciduric species. In gingivitis, plaque accumulation at the gingival margin leads to inflammation and increasing proportions of proteolytic and often obligate anaerobic species.
- There is moderately strong evidence for a genetic contribution to periodontal diseases and caries susceptibility, with an attributable risk estimated to be of up to 50%.
- There has been a global decline in the incidence of caries and probably periodontal diseases, although the increase in the global population and tooth retention implies a bigger burden of disease at the population level.

Perio & Caries, a project based on Perio Workshop 2016

Working group 1:

Role of microbial biofilms in the maintenance of oral health and the development of dental caries and periodontal diseases

This working group chaired by Mariano Sanz (EFP) and David Beighton (ORCA), reviewed the ecological interactions at the dental biofilm in health and disease, the role of microbial

communities in the pathogenesis of periodontitis and caries, and the innate host response in caries and periodontal diseases.

Among its main findings were that the biofilm is an essential component involved in the development of caries and periodontal diseases. As a result, understanding the composition and inter-microbial interactions is fundamental for developing effective preventive and therapeutic measures.

In the same way, knowledge of the microbe-host interactions involved in the maintenance of oral health and the initiation and progression of both dental caries and periodontal diseases is key to improving preventive strategies and to designing new strategies to improve oral health.

Chairmen:

Mariano Sanz, David Beighton

Review papers:

The global burden of caries and periodontal diseases (by Thomas Dietrich & Joannes Frencken)

Socio-behavioural aspects in the prevention and control of dental caries and periodontal diseases at an individual and population level (by Christof Dörfer & Julian Schmoeckel)

Mechanical and chemical plaque control in managing gingivitis and caries: a systematic review (Elena Figuero & Joana Carvalho)

Reviewers:

Egija Zaura, Alex Mira, Mark Herzberg, Philip Marsh, Mike Curtis, Jörg Meyle

Participants:

Irene Dige, Svante Twetman, Jaime Cury, Rodrigo Giacaman, Eric Reynolds, Andrea Mombelli, David Herrera, Eija Könönen, Marc Quirynen, Lior Shapira

Colgate representative:

Irina Chivu

Staff member:

Ana Molina

Working group 2:

Interaction of lifestyle, behaviour or systemic diseases with oral health, dental caries and periodontal diseases

This group, chaired by Iain Chapple (EFP) and Andreas Schulte (ORCA), carried out a systematic review of genetic risk factors, a narrative review of the role of diet and nutrition, and reference documentation for modifiable acquired risk factors that are common to both diseases.

There is moderately strong evidence for a genetic contribution to susceptibility to both periodontal diseases and caries, although the literature is more substantial for the former than for the latter. The genes involved in each are different and no common genetic variants were found.

Fermentable carbohydrates (sugars and starches) were the most relevant common dietary risk factor for both diseases, but the associated mechanisms differed. The working group also found that “functional foods” or probiotics could be helpful in preventing caries and in managing periodontal disease, although it noted that evidence is limited and that the biological mechanisms involved are not yet fully understood.

In terms of acquired risk factors for both caries and periodontal diseases, the most common are hypo-salivation, rheumatoid arthritis, smoking, undiagnosed or poorly controlled diabetes, and obesity.

Chairmen:

Iain Chapple, Andreas Schulte

Review papers:

Shared modifiable risk factors for dental caries and periodontal diseases (by Guglielmo Campus & Philippe Bouchard)

Genetic and epigenetic regulation of gene expression and its possible role in the pathogenesis of caries and periodontal disease (by Luigi Nibali & Alexandre Vieira)

Nutrition, dental caries, and periodontal disease: a practical overview (by Philippe Hujoel & Peter Lingström)

Reviewers:

Guglielmo Campus, Alexandre Vieira, Peter Lingström, Philippe Bouchard, Luigi Nibali, Philippe Hujoel

Participants:

Nadine Schlüter, Chris Rahiotis, Cor van Loveren, David Manton, Nigel Pitts, Marja Laine, Wim Teughels, Fridus van der Weijden, Henrik Dommisch

Colgate representative:

Michael Schneider

Staff member:

Eduardo Montero

Working group 3:

Prevention and control of dental caries and periodontal diseases at individual and population level

Chaired by Søren Jepsen (EFP) and Vita Machiulskiene, this group reviewed the current state of knowledge on epidemiology, social-behavioural aspects, and plaque control, while noting that both caries and gum share common risk factors and social determinants that are important for their prevention and control.

Its three systematic reviews focused on: (1) the global burden of caries and periodontitis on mankind, (2) socio-behavioural aspects in the prevention and control of caries and periodontal disease at an individual and population level, and (3) mechanical and chemical plaque control in the simultaneous management of gingivitis and dental caries.

Key findings from this working group included the fact that the prevalence and experience of dental caries has decreased in many regions in all age groups over the last three decades, but not all social groups have benefitted equally from this fall. In addition, while some studies have indicated a possible decline in the prevalence of periodontitis, there is not enough evidence to conclude that prevalence has changed over recent decades.

Global population growth and increased tooth retention means that the number of people affected by dental caries and periodontitis has grown substantially – untreated caries by 37% and severe periodontitis by 67% between 1990 and 2013.

The most important behavioural factor for both diseases is efficient self-performed oral hygiene – tooth brushing with a fluoride toothpaste and interdental cleaning – while professional tooth cleaning, oral-hygiene instruction and motivation, dietary advice, and fluoride application are effective in managing both dental caries and gingivitis.

Chairmen:

Søren Jepsen, Vita Maciulskiene

Review papers:

The global burden of caries and periodontal diseases (by Thomas Dietrich & Joannes Frencken)

Socio-behavioural aspects in the prevention and control of dental caries and periodontal diseases at an individual and population level (by Christof Dörfer & Julian Schmoeckel)
Mechanical and chemical plaque control in managing gingivitis and caries: a systematic review (Elena Figuero & Joana Carvalho)

Reviewers:

Joannes Frencken, Julian Schmoeckel, Joana Carvalho, Thomas Dietrich, Christof Dörfer, Elena Figuero

Participants:

Monique van der Veen, Kim Ekstrand, Wolfgang Buchalla, Livia Tenuta, Marisa Maltz, Susan Higham, Thomas Kocher, Filippo Graziani, Juan Blanco, Anton Sculean, Panos Papapanou
Representative from Platform for a Better Oral Health in Europe: Ken Eaton

Colgate representative:

Roger Elwood

Staff member:

Alberto Ortiz-Vigón

Working group 4:

Age-related effects on oral health, dental caries and periodontal diseases

Chaired by Maurizio Tonetti (EFP) and Sebastian Paris (ORCA), this group reviewed scientific evidence and developed specific recommendations to prevent tooth loss and retain oral function through the prevention and treatment of caries and periodontal diseases later in life, and to increase awareness of the health benefits of oral health as an essential component of healthy ageing.

Over the last two decades, progress in the prevention and treatment of caries and periodontal diseases have led to better oral health and improved tooth retention in the adult population. The ageing population and the increasing expectations among older people of good oral-health-related quality of life pose big challenges to clinical care and healthcare systems.

Three systematic reviews were carried out, on: (1) aspects of caries and periodontal diseases in elders; (2) the impact of ageing on caries and periodontal diseases; and (3) the effectiveness of interventions.

The experts found that an increase in the total burden posed by caries and periodontal diseases among the older population is a likely consequence of an ageing population, trends in risk factors, and improved tooth retention. It noted that specific surveillance is required to monitor changes in oral health in the older population and that ageing impacts oral health, including periodontitis and possibly susceptibility to caries.

Noting the evidence that caries and periodontal diseases can be prevented and treated in older adults, the group found that oral health and functional tooth retention later in life provides benefits in quality of life and in preventing physical decline and dependency by fostering a healthy diet.

In the light of these findings, it is recommended that oral-healthcare professionals and individuals should not base decisions impacting tooth retention on chronological age but on level of dependency, life-expectancy, frailty, comfort, and quality of life. As a consequence, health policy should remove barriers to oral healthcare for vulnerable elders.

Chairmen:

Maurizio Tonetti, Sebastian Paris

Review papers:

Aging, dental caries and periodontal diseases (by Rodrigo Lopez & Falk Schwendicke)

Changes in immune function (immune senescence) in caries and periodontal diseases: a systematic review (by Philip Preshaw & Georg Conrads)

Gingival recession and root caries in the ageing population: a critical evaluation of treatments (by Peter Heasman & Bente Nyvad)

Reviewers:

Falk Schwendicke, Georg Conrads, Bente Nyvad, Rodrigo Lopez, Philip Preshaw, Peter Heasman

Participants:

Peter Bottenberg, Alix Young, Jacques Vannobergen, Marie-Charlotte Huysmans, Gert Jan van der Putten, Stefan Renvert, Ian Needleman, Phoebus Madianos, Leonardo Trombelli, Peter Eickholz, Frauke Muller, Nicola West

Colgate representative:

Ian Pretty

Staff members:

Ignacio Sanz-Sanchez, Ignacio Sanz-Martin

Authors



Nicola West

Nicola West is a British periodontist, implantologist, and specialist in endodontics and prosthodontics, who works since 2010 as professor and honorary consultant in Restorative Dentistry (Periodontology) at the School of Oral and Dental Sciences of the Bristol Dental School and Hospital, in southern England. Her previous appointment was as lecturer at the same University of Bristol. Currently she is the secretary of the British Society of Periodontology.

Author of multiple research publications, Prof West leads one of the largest Dental Clinical Trials Units in the UK and is considered a world authority in toothwear and dentine hypersensitivity, an oral pain condition affecting more than half the world's population. She is behind the development of an intra oral dental appliance that revolutionized the way research was conducted, by allowing development and evaluation of oral healthcare products without causing harm to the teeth.

Prof West collaborated with the Universities of Lyon, King's, Madrid, Berne, and Paris in a multicentre prevalence toothwear study across 7 European countries (2011-2013) to determine risk factors in order to improve oral health and reduce dental treatment. Toothwear is increasing with prevalence of 40%. She extended this work to Africa, Asia and the US - her work on tooth surface loss resulted in marketing the low erosive beverage, Ribena ToothKind, now Ribena Light (first low erosive beverage accredited by the British Dental Association).

Furthermore, Nicola West innovated by launching in 2013-16 the first study measuring real time acidic drink tooth erosion and natural tooth repair using living teeth. These studies show public benefit from delaying tooth brushing more than 2 hours after imbibing acidic drinks to avoid tooth damage. She has worked extensively in the fields of tooth repair, prevention of daily tooth pain, loss of tooth structure and oral function by patient education, self applied toothpaste treatment, and assessment of dental implant failure.

Finally, as an international clinical trainer Prof West has supported new researchers in dentine hypersensitivity pain and toothwear assessment centres in four continents.

Authors



Søren Jepsen

Søren Jepsen is professor and chairman of the department of Periodontology, Operative and Preventive Dentistry at the University of Bonn, Germany. Previously he was assistant professor in the department of Prosthodontics at the University of Hamburg and later associate professor in the department of Conservative Dentistry and Periodontology at the University of Kiel.

Prof Jepsen received his dental and his medical degrees from the University of Hamburg in 1981 and 1986 and a MS in Periodontology from Loma Linda University, California, USA, in 1992. He became a diplomate of the American Board of Periodontology in 1999.

Prof. Jepsen became elected member of Leopoldina (German National Academy of Sciences) in 2005. He was elected and invited as chair of the department of Periodontology, University of Berne in 2007. Since 2008 he is speaker of the Clinical Research Unit 208 "Aetiology and Sequelae of Periodontal Diseases" funded by the German Research Foundation at the University of Bonn.

He served as president of the European Federation of Periodontology from 2015-2016, is co-chair of the organizing committee for the AAP/EFPP World Perio Workshop on a New Classification of Periodontal and Peri-implant Diseases in November 2017, and scientific chair for EuroPerio9 in 2018.

Prof. Jepsen has lectured and published extensively, has received numerous awards and is associate editor of the *Journal of Clinical Periodontology* and editorial board member of *Clinical Oral Implants Research*, the *European Journal of Oral Implantology*, and the *Chinese Journal of Dental Research*.

Authors



Iain Chapple

Iain Chapple is professor of Periodontology and head of the School of Dentistry at the University of Birmingham, UK. He is former scientific editor of the *British Dental Journal* and the *Journal of Periodontal Research*, and currently associate editor of the *Journal Clinical Periodontology and Periodontology 2000*. He has written seven-textbooks and 16 book chapters.

Prof Chapple was president of the IADR Periodontal Research Group (2006-07), and group program chair (2008-1015), and is currently their council representative.

At the EFP he was treasurer of the organisation 2007-2013, co-organiser of the Perio Workshops, chairman of the EFP's scientific advisory committee, and editor of the *JCP Digest* (2014-2016). Currently he is its Secretary General.

Furthermore, Prof Chapple was president of the British Society of Periodontology in 2014-2015 and was awarded the Charles Tomes medal by the Royal College of Surgeons in 2011 and also the Rizzo Research Award of the IADR Periodontal Research Group in 2001.

He leads Birmingham's Periodontal Research Group, part of Birmingham's MRC Centre for Immune Regulation. Finally, he has published over 160 peer reviewed manuscripts in the international scientific literature and is director of Research for the Institute of Clinical Sciences. He runs a regional clinical NHS service for a population base of 6 million and also a national oral service for adults patients with *Epidermolysis Bullosa*.

Authors



Mariano Sanz

Mariano Sanz is professor and chair of periodontology at the University Complutense of Madrid (Spain) and a professor in the faculty of odontology at the University of Oslo (Norway).

He graduated in medicine in 1981 from the University Complutense of Madrid, from which he received a degree in stomatology in 1983 and where he qualified as a Doctor of Medicine in 1985. He received his speciality in periodontology from the University of California in Los Angeles (UCLA) in 1987. He has received honorary doctorates from the University of San Sebastian in Santiago (Chile), the University of Gothenburg (Sweden), and the University of Coimbra (Portugal).

Since 2005, Prof Sanz has been chair of the ETEP research group on the aetiology and therapy of periodontal diseases, whose main lines of research are oral microbiology, bacterial-host interactions, and antimicrobial approaches in the treatment of gingivitis and periodontitis. The research group has conducted clinical trials to measure the efficacy of different approaches to periodontal regeneration, surgical protocols using dental implants, and therapeutic approaches to treat peri-implantitis.

Prof Sanz has published 230 articles in scientific journals, written 50 book chapters, and has participated as an invited speaker at more than 200 scientific events in the last five years. He is an associate editor of the *Journal of Clinical Periodontology* and *Evidence-Based Dental Practice*, and a member of the editorial boards of various other dental journals.

He has been awarded the Jens Waerhaug Research Prize by the Scandinavian Society of Periodontology (1984), the Outstanding Service Award from the International Association for Dental Research (2015), and the IADR Straumann Award in Periodontal Regenerative Medicine (2015).

He is a member of the executive committee of the European Federation of Periodontology (EFP) and chair of its workshop committee. He has previously served the EFP as both president (1993-1994) and secretary general (1998-2005). He is president of the Osteology Foundation, president of the International Association for Dental Research's continental European division, and president-elect of the Association for Dental Education in Europe (ADEE).

Authors



Maurizio Tonetti

Maurizio Tonetti is currently clinical professor of Periodontology at the Faculty of Dentistry of the Hong Kong University, and executive director of the European Research Group on Periodontology (ERGOPerio). Previously, Prof Tonetti was professor and head of the department of Periodontology at the School of Dental Medicine of the University of Connecticut. He served as well as professor and head of the departments of Periodontology at the University College in London, at the University of Berne, and at the University of North Carolina at Chapel Hill, USA. Currently he is the editor in chief of the *Journal of Clinical Periodontology*.

Regarding his clinical activity, as a specialist in periodontology Prof Tonetti maintains a part-time private practice limited to periodontology and implant surgery with emphasis on regeneration, minimally invasive surgery and microsurgery. He has been working for years with leading colleagues to provide periodontal care and dental implant treatment to the world elite.

The focus of his recent research activity is threefold: (1) improved understanding of periodontal infections and their general health consequences; (2) regeneration and bio-engineering of lost periodontal structures; and (3) replacement of hopeless teeth with dental implants. The research of his team has spanned from fundamental discovery to clinical translation.

Prof Tonetti is widely recognised for his contributions to improved periodontal diagnosis and risk assessment, control of periodontitis, the practice of periodontal regeneration, and design and execution of large clinical trials in periodontology and implant dentistry. His scientific work has been cited 20,000 times and has an H-factor of 79. He has been engaged worldwide in the planning and delivery of advanced educational programs in the fields of periodontology and implant dentistry.

"Perio & Caries", a joint **EFP - Colgate** project



The European Federation of Periodontology (EFP) is the leading global voice on gum health and gum disease and the driving force behind EuroPerio – the most important international periodontal congress – and Perio Workshop, a world-leading meeting on periodontal science. The EFP also edits the Journal of Clinical Periodontology, the most authoritative scientific publication in this field, with a 3.915 impact factor.

The EFP comprises 30 national societies of periodontology in Europe, northern Africa, Caucasia, and the Middle East, which together represent about 14,000 periodontists, dentists, researchers, and other members of the dental team focused on improving periodontal science and practice.

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