

Developing the role of the sports dentist

Julie Gallagher,^{*1} Peter Fine,² Paul Ashley¹ and Ian Needleman¹

Key points

The risks to athlete oral health can and should be mitigated; the role of the sports dentist is evolving to meet these new challenges.

As integrated members of the athlete support team, dentists and dental care professionals can provide sport-specific oral health advice, encouraging athletes to take ownership of their oral health.

A UK-wide network of dentists and other oral health professionals with an interest in sport is important, both to ensure that appropriate advice and treatment is evidence-based and to further develop the research and clinical foundations.

Abstract

Sports dentistry has traditionally focused on orofacial trauma. There is now increasing evidence that participation in sport, particularly at elite level, may significantly increase the risks to oral health. The negative impact of poor oral health on athlete-reported wellbeing and performance is clear. The risks to athlete oral health can and should be mitigated and the role of the sports dentist is evolving to meet these new challenges. Custom-made mouthguards provide protection against orofacial trauma and potentially, concussion. Oral health screening should be included in athlete pre-season preparation. As integrated members of the athlete support team, dentists and dental care professionals can provide sport-specific oral health advice, encouraging athletes to take ownership of their oral health. The potential for translational health and wellbeing benefits to the wider population is also substantial, particularly with youth groups and recreational athletes. Sports dentistry requires distinctive skills. A UK-wide network of dentists and other oral health professionals with an interest in sport is important, to ensure that both appropriate advice and treatment is evidence-based and to further develop the research and clinical foundations.

Introduction

Sports dentistry to date has largely focused on orofacial trauma;¹ sport activities can account for up to one-third of all orofacial injuries.² There is now increasing evidence that exercise training and competition, particularly at elite level, may significantly increase the oral health risk to athletes.³ Furthermore, the negative impact of poor oral health on athlete-reported wellbeing and performance is now clear.^{3,4,5} Oral health is integral to general health and wellbeing. The risks to athlete oral health during training and competition can and

should be mitigated. The role of the sports dentist needs to evolve to meet these new challenges. A UK-wide network of dentists and other oral health professionals with an interest in sport is important, both to ensure that appropriate advice and treatment is evidence-based and to further develop the research and clinical foundations.⁶

Protection against orofacial trauma and concussion

There is good evidence that mouthguards protect against dentoalveolar trauma among athletes in contact sports.⁷ Mouthguards may also mitigate against concussion in sport.⁸ A recent study in youth ice hockey players found a reduction in both concussion and dental injuries⁹ and it has been recommended that mouthguards should be mandatory in contact sports where concussion is a significant risk.¹⁰

Although athletes have expressed concern about the negative impact of mouthguards,

custom-made mouthguards (CMMs) show the smallest range of changes in players' performance, compared with other types.¹¹ Dentists with an interest in sport should be able to advise athletes appropriately about the advantages of wearing a mouthguard and provide appropriate CMMs that are comfortable and not perceived by the athlete to interfere with their athletic performance.

A dentist with specialist training can be a valuable addition to the match-day medical team, either at the ground or on the phone to coordinate the management of orofacial trauma.

Oral health screening

Like overuse injuries, oral diseases such as caries, erosive tooth wear and periodontal diseases do not present with severe pain in their early stages and athletes continue to train and compete, even with symptoms. As part of their pre-season preparation, elite athletes routinely undergo a periodic

¹University College London, Eastman Dental Institute, Centre for Oral Health and Performance, Rockefeller Building, 21 University Street, London, WC1E 6DE, UK; ²University College London, Eastman Dental Institute, Centre for Continuing Professional Development, London, UK.

*Correspondence to: Julie Gallagher
Email: julie.gallagher@ucl.ac.uk

Accepted 7 June 2021

<https://doi.org/10.1038/s41415-021-3612-9>

health examination (PHE) and oral health screening should be included.¹²

It is important to establish appropriate services to manage athlete oral health on a continuous basis and not only during major competitions. As integrated members of the athlete support team, dentists and dental care professionals (DCPs) can provide oral health advice for athletes either at the dental surgery or as part of a pre-season PHE.¹ A dentist or other member of the dental team may be the first health care professional to identify the signs of disordered eating through dental erosion.¹³ We have found that oral health screening, provided at athlete training venues, is convenient for and well accepted by athletes and other support team members.^{3,14}

Screening/early recognition of disease is well established in health care. Use of standard clinical indices such as the International Caries Detection and Assessment System,¹⁵ the Basic Periodontal Examination¹⁶ and the Basic Erosive Wear Examination¹⁷ allow greater clarity when reporting prevalence of disease for epidemiologic studies and when providing athlete feedback regarding individual risk.

The Oslo Sports Trauma Research Centre overuse injury questionnaire has validity to measure the impact of injury and illness on performance in sport^{18,19} and can easily be modified to monitor oral health problems in sport.

Oral health promotion to reduce performance impacts

Elite athletes often begin their careers when they join youth development squads and should be equipped to take ownership of their oral health.²⁰ The most important behavioural factor affecting both dental caries and periodontal diseases is routinely performed, effective oral hygiene (dental biofilm removal) with fluoride.²¹ A feasibility study, based on contemporary behaviour change theory and designed with input from athletes,²² was successfully implemented within three different high performance sport environments and was associated with an increase in athlete oral health knowledge, enhanced oral health behaviour and a reduction in self-reported performance impacts.¹⁴ All members of an integrated athlete support team have a role to play in health promotion and injury prevention.^{23,24}

Oral appliances to enhance performance

The deliberate repositioning of the mandible by a mouthpiece has been reported to positively influence athletic performance.²⁵ However, this potentially exciting development requires further research.

Integrating sports dentistry with sports and exercise medicine

A stated priority of the International Olympic Committee is to protect the health of the athlete¹² and international sporting bodies advocate a holistic approach to ensuring athlete wellbeing and performance.²⁶ Sports and exercise medicine (SEM) also aims to improve overall health and wellbeing of athletes of any level and in all sports around the world.¹ Youth groups and recreational athletes are important groups within SEM,²⁷ where there is potential to improve general health, wellbeing and oral health.

Sports dentistry requires distinctive skills with training, research and development, ongoing in a number of centres internationally. Elite athletes are cared for by a team that includes sports medicine doctors, physiotherapists, nutritionists, sports psychologists and orthopaedic specialists. Sports dentists should be and are becoming an integral part of that team.⁶ As such, the provision of appropriate training through university-based degree programmes is a significant development and should be accompanied by innovative research to address the needs of athletes. The potential for translational health and wellbeing benefits to the wider population is also substantial.

Expanding the network

You can join our growing community committed to raising awareness of oral health as an integral part of general health and wellbeing in athletes and sports people at www.ucl.ac.uk/cohp. There are also links to University College London post-graduate education opportunities in sports dentistry.

Author contributions

Julie Gallagher and Peter Fine devised the initial draft and developed the final draft. Ian Needleman and Paul Ashley contributed to the final draft. All authors reviewed and approved the final draft.

Acknowledgements

Thanks to Dr John Haughey, University College London, for assisting in reviewing the final draft.

Ethics declaration

The authors declare no conflicts of interest.

References

1. Stamos A, Mills S, Malliaropoulos N *et al*. The European Association for Sports Dentistry, Academy for Sports Dentistry, European College of Sports and Exercise Physicians consensus statement on sports dentistry integration in sports medicine. *Dent Traumatol* 2020; DOI: 10.1111/edt.12593.
2. Knapik J J, Hoedebecke B L, Rogers G G, Sharp M A, Marshall S W. Effectiveness of Mouthguards for the Prevention of Orofacial Injuries and Concussions in Sports: Systematic Review and Meta-Analysis. *Sports Med* 2019; **49**: 1217–1232.
3. Gallagher J, Ashley P, Petrie A, Needleman I. Oral health and performance impacts in elite and professional athletes. *Community Dent Oral Epidemiol* 2018; **46**: 563–568.
4. Needleman I, Ashley P, Petrie A *et al*. Oral health and impact on performance of athletes participating in the London 2012 Olympic Games: a cross-sectional study. *Br J Sports Med* 2013; **47**: 1054–1058.
5. Needleman I, Ashley P, Meehan L *et al*. Poor oral health including active caries in 187 UK professional male football players: clinical dental examination performed by dentists. *Br J Sports Med* 2016; **50**: 41–44.
6. Needleman I, Ashley P, Fine P *et al*. Oral health and elite sport performance. *Br J Sports Med* 2015; **49**: 3–6.
7. Fernandes L M, Neto J C L, Lima T F R *et al*. The use of mouthguards and prevalence of dento-alveolar trauma among athletes: A systematic review and meta-analysis. *Dent Traumatol* 2019; **35**: 54–72.
8. Emery C A, Black A M, Kolstad A *et al*. What strategies can be used to effectively reduce the risk of concussion in sport? A systematic review. *Br J Sports Med* 2017; **51**: 978–984.
9. Chisholm D A, Black A M, Palacios-Derflingher L *et al*. Mouthguard use in youth ice hockey and the risk of concussion: nested case-control study of 315 cases. *Br J Sports Med* 2020; DOI: 10.1136/bjsports-2019-101011.
10. Allison P, Tamimi F. Mouthguards should be worn in contact sports. *Br J Sports Med* 2020; **54**: 1016–1017.
11. Ferreira G B, Guimaraes L S, Fernandes C P *et al*. Is there enough evidence that mouthguards do not affect athletic performance? A systematic literature review. *Int Dent J* 2019; **69**: 25–34.
12. Ljungqvist A, Jenoure P, Engebretsen L *et al*. The International Olympic Committee (IOC) Consensus Statement on periodic health evaluation of elite athletes March 2009. *Br J Sports Med* 2009; **43**: 631–643.
13. Needleman I, Ashley P, Fairbrother T *et al*. Nutrition and oral health in sport: time for action. *Br J Sports Med* 2018; DOI: 10.1136/bjsports-2017-098919.
14. Gallagher J, Ashley P, Needleman I. Implementation of a behavioural change intervention to enhance oral health behaviours in elite athletes: a feasibility study. *BMJ Open Sport Exerc Med* 2020; DOI: 10.1136/bmjsem-2020-000759.
15. Ismail A I, Sohn W, Tellez M *et al*. The International Caries Detection and Assessment System (ICDAS): an integrated system for measuring dental caries. *Community Dent Oral Epidemiol* 2007; **35**: 170–178.
16. British Society of Periodontology. The Good Practitioner's Guide to Periodontology. 2016. Available at https://www.bsperio.org.uk/assets/downloads/BSP_BPE_Guidelines_2019.pdf (accessed October 2017).
17. Bartlett D, Ganss C, Lussi A. Basic Erosive Wear Examination (BEWE): a new scoring system for scientific and clinical needs. *Clin Oral Invest* 2008; DOI: 10.1007/s00784-007-0181-5.

18. Clarsen B, Myklebust G, Bahr R. Development and validation of a new method for the registration of overuse injuries in sports injury epidemiology: the Oslo Sports Trauma Research Centre (OSTRC) overuse injury questionnaire. *Br J Sports Med* 2013; **47**: 495–502.
19. Gallagher J, Needleman I, Ashley P, Sanchez R G, Lumsden R. Self-Reported Outcome Measures of the Impact of Injury and Illness on Athlete Performance: A Systematic Review. *Sports Med* 2017; **47**: 1335–1348.
20. Bergeron M F, Mountjoy M, Armstrong N *et al*. International Olympic Committee consensus statement on youth athletic development. *Br J Sports Med* 2015; **49**: 843–851.
21. Jepsen S, Blanco J, Buchalla W *et al*. Prevention and control of dental caries and periodontal diseases at individual and population level: consensus report of group 3 of joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases. *J Clin Periodontol* 2017; DOI: 10.1111/jcpe.12687.
22. Gallagher J, Ashley P, Petrie A, Needleman I. Oral health-related behaviours reported by elite and professional athletes. *Br Dent J* 2019; **227**: 276–280.
23. Burke L M, Castell L M, Casa D J *et al*. International Association of Athletics Federations Consensus Statement 2019: Nutrition for Athletics. *Int J Sport Nutr Exerc Metab* 2019; **29**: 73–84.
24. Donaldson A, Lloyd D G, Gabbe B J, Cook J, Finch C F. We have the programme, what next? Planning the implementation of an injury prevention programme. *Inj Prev* 2017; **23**: 273–280.
25. Haughey J P, Fine P. Effects of the lower jaw position on athletic performance of elite athletes. *BMJ Open Sport Exerc Med* 2020; DOI: 10.1136/bmjsem-2020-000886.
26. Burns L, Weissensteiner J R, Cohen M. Lifestyles and mindsets of Olympic, Paralympic and world champions: is an integrated approach the key to elite performance? *Br J Sports Med* 2019; **53**: 818–824.
27. Finch C F, Talpey S, Bradshaw A, Soligard T, Engebretsen L. Research priorities of international sporting federations and the IOC research centres. *BMJ Open Sport Exerc Med* 2016; DOI: 10.1136/bmjsem-2016-000168.