EDITORIAL

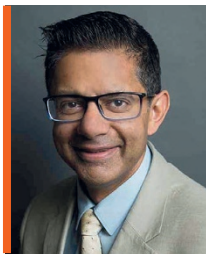
'Minimum intervention' – MI inspiring future oral healthcare?

Professor Avijit Banerjee, Guest Editor *BDJ* Minimum Intervention Themed Issue and
Professor of Cariology & Operative Dentistry, King's College London Dental Institute, King's Health Partners, London, UK

The *BDJ* Upfront section includes editorials, letters, news, book reviews and interviews. Please direct your correspondence to the News Editor, Kate Quinlan at BDJNews@nature.com. Press releases or articles may be edited, and should include a colour photograph if possible.

In 2013, my dear friend and *BDJ* Editor-in-Chief Stephen Hancocks kindly invited me to author an opinion piece outlining the concept of minimum intervention (MI) dentistry and the challenges it might face in gaining acceptance in mainstream dentistry.[1] Four years on, I am delighted and honoured to be asked to coordinate, co-author and present this MI-themed *BDJ* issue as its guest editor, with a selection of quality manuscripts from nationally and internationally renowned professionals and dear colleagues with an acknowledged expertise in MI dentistry. The advances in restorative biomaterials, clinical operative techniques/technologies, behaviour management and motivational interviewing, are all enabling oral healthcare teams to deliver successfully this contemporary approach to achieve and maintain oral health and long-term wellbeing.

Minimum (or minimal) intervention (MI) oral healthcare, with particular respect to dental caries management, is clearly, now in 2017, on the professional, public, industry, UK government and even international (FDI and World Health Organisation [WHO]), radar.[2–5] As knowledge is continually expanding, along with scientific and clinical evidence for the MI approach, it is clear that all stakeholders (the oral healthcare profession, public, oral health/dental industry partners, dental educators and healthcare regulatory bodies) must now fully engage with each other to help implement its delivery and make 'MI' the norm and eventually, the term 'MI' itself, obsolete. As with instigating any major change within long-established systems, there is some understandable concern about how to implement MI clinical care logistically within the current National Health Service (NHS) and other regulatory contract frameworks. The practice of managing dental caries has evolved and nowadays requires an "alternative" professional skill set to be appreciated fully and used effectively. This is primarily due to: a change in patient attitudes with regard to their expectations of desired outcomes and a better understanding of the caries process and its prevention and management. Regarding the latter point, the traditional surgical approach of treating all patients with caries in the same fashion, cutting often over-sized cavities and placing restorations is neither a cure nor even the correct long-term management strategy for this most prevalent of non-communicable diseases.[6,7] The cure for dental caries, or its control, originates from long-term preventive actions, engagement with and behaviour change of the patient, guided and ably assisted by all members of the oral healthcare team (dentists, nurses, therapists, hygienists, extended duties dental nurses [EDDNs], reception staff, practice managers) giving the same oral health message. Minimally invasive operative repair of the tissue defects/damage as a consequence of the continued, uncontrolled caries process of course plays an important part in overall management, but should not be the focal aspect of care provided.



All stakeholders must understand that dental caries is a lifestyle-related disease

'MI' definitions…

'Minimum (or minimal) intervention' care describes the holistic team-care approach to help maintain long-term oral health with preventive, patient-focussed, behaviour-related care plans combined with the dutiful management of patients' needs, desires and expectations. The patient (and profession) must understand that dental caries is a lifestyle-related non-communicable disease which is ultimately the patients' own responsibility to control and prevent, aided and abetted to a varying extent, by the full oral healthcare team. The four overlapping and interlinked phases of the minimum intervention care plan have been published previously and include detection/diagnosis/risk assessment/care planning; disease control and prevention; minimally invasive operative management; and recall phases.[1,6,7]

Minimally invasive dentistry is included as part of this minimum intervention care plan. Dental caries should not be 'treated' as if it were gangrene, with its complete surgical excision (including provision of an extensive healthy margin), a tenet underpinning past traditional operative teachings. Giving carious tissues the opportunity to arrest, remineralise and, when uncontrolled progression is observed, the use of a biologically selective tissue-preserving surgical approach to caries removal must now be considered the norm.[8,9] Consideration must be given to the 'golden triangle' of minimally invasive operative caries management, where the three factors of tissue histology, dental biomaterials science and clinical handling of the patient and materials, together will permit

Official journal of the British Dental Association.

the successful implementation of minimally invasive dentistry in all patients.[1,6,7,10-12]

It's all about 'MI' behaviour and willingness to change!

Even though there is a burgeoning knowledge and acceptance of the MI philosophy in health care *per se*, there are persistent barriers blocking its successful implementation across the oral healthcare sector. If one assumes any MI change will occur incrementally, as opposed to a sudden radical overhaul to existing systematic frameworks and protocols, then solutions will lie in enabling small practical changes in both the profession and public mindsets that will gain traction and ultimately, exponential rapid adherence across the board. Fundamentally, the primary barrier to MI implementation is behaviour change in both the profession and public, as well as other stakeholders including dental industry partners, educators and regulatory bodies. Even though all stakeholders understand and agree in principle with the MI rationale and approach, do people really *want* to change from the current system of oral healthcare delivery? An appraisal of behaviour management rationale indicates it can be deconvoluted into the principle constructs of personal capabilities, opportunities and motivation, each being applied to all the relevant stakeholders listed above.[13]

Are 'MI' stakeholders *capable* of change?

From the dental profession's viewpoint, the answer is undoubtedly 'yes'. Contemporary undergraduate cariology curriculae embrace MI teaching susceptibility patient behaviour/attitude management skills and non-operative prevention.[14-16] New MI technologies and techniques will also need to be experienced and practised on postgraduate continuing profession development (CPD) and degree courses for those working, not having benefitted from the latest UG education. An innovative flexible-learning Masters programme in Advanced Minimum Intervention Dentistry (AMID) at King's College London Dental Institute now provides a comprehensive postgraduate education, accessible globally to practising dentists and dental therapists.[17] It is hoped that this Masters programme will promote the development of an UK-wide/global MI practice-based research network to help provide the much-needed physical 'real life' clinical evidence to corroborate this logical healthcare philosophy.

Oral disease distribution is being polarised gradually by demographics, affected by socio-economic determinants. National public promotions to publicise general health issues are resulting slowly in beneficial attitude change. This indicates the *capability* for change in this regard. Oral health, however, still tends to be given a low prioritisation by many sectors of the public. Greater efforts are required by the profession and regulatory bodies to engage with, and obtain feedback from, the public, highlighting the significant quality of life improvements that good long-term oral health would bring individuals directly and indirectly in populations. There must be a drive to increase the priority of maintaining oral health in the general healthcare stakes while at the same time diluting the premise of many who believe it is the dental profession's responsibility to do this, rather than their own.

Ultimately, there is no simple panacea for all oral/dental disease and a collective, concerted effort is required from the public and profession. The MI team network approach centred on the patient's long-term care and wellbeing must be emphasised along with the need for regular but personalised maintenance and review consultations to maintain the biologic success of treatments and continued optimal oral health.

Do 'MI' stakeholders have the *opportunity* for change?

The NHS continues to fund significant proportions of the dental care provided to the UK population. It attempts to provide a system to encourage the treatment of disease, to distribute as fairly as possible the provision of dental services to the wider community within the constraints of ever more stringent financial budgeting, to remunerate the healthcare providers and help regulate them for the safety of patients.[18] Remuneration models in the past have been based around numbers of patients treated/operative procedures carried out as these were quantifiable outcomes on which to base payments and regulate service. However, this approach risks actively encouraging dentists to treat patients perhaps more frequently than necessary and operate too invasively to the ultimate detriment of patients, as it is these very outcomes that are rewarded. NHS dental contracts have come and gone, with the latest prototype practices under trial offering hope that the system will begin to value non-operative disease control and prevention in the general population at least as equally as operative interventions.

A susceptibility (risk) assessment-based approach to disease prevention and targeted patient management should be heralded as a step in the right direction. However, care needs to be taken to ensure capitation and activity requirements are both achievable and practical, supporting both patients to improve and maintain their oral health as well as sustainable oral health practices. As patients and their oral health status are different and are prone to change over time, so the ideal contract framework should also be. For example, healthy, low-risk individuals should have different care pathways (with respect to the numbers/frequency of consultation appointments, use of different team members to manage their oral healthcare delivery, use of adjunctive home-care prevention-based products/technology etc) compared to varying high-risk groups of the population, who would require more targeted, practice-based, resource-intensive management. The profession should ideally be regulated and remunerated accordingly, with a mix of capitation funding for longer term team care, as well activity payments in certain clinical circumstances. This has been trialled in the latest proto-pilot dental contract scheme where the UDA targets in practices have been reduced to allow more time to be given for prevention as opposed to interventive treatment, alongside blended capitation/activity models.

'MI' oral healthcare clinics/teams should endeavour to change the risk level of their patients, from red (high risk) to green (low risk) patients by team-delivered, non-operative preventive regimes helping patients to take more care and responsibility for their own oral health. In so doing, team practices will be able to increase their patient list sizes, optimise patient throughput using all team members efficiently, with a concomitant reduction in the need to carry out NHS Band 2 and 3 treatment. Reducing the incidence of caries in their patients will ultimately limit the need to do further complex restorative treatments to those in specific need and caries prevention will become the primary goal. Workforce modelling will be required to enable this to occur along with suitable regulatory procedures in place to record accurately the patient care outcomes delivered. Sustainability will require honest professional self-reporting and the regulatory bodies working together with the profession, to help understand and appreciate the flexibility and complexity of such contracts when tailoring suitable oral health care to individuals

Official journal of the British Dental Association.

as well as populations. A more blinkered, tunnel-vision approach in this relationship will surely fail. If MI oral healthcare is offered as the simple alternative to patients whilst being profitable and sustainable to the profession also, it will become the mainstay in general dental practice.

With the proposals discussed above, it is evident that the traditional dental practice business model must evolve in order to be able to support the successful MI oral healthcare practice of the future. The general dentist must learn to use the skills of their team: nurses with oral health education certification (EDDNs), hygienists, therapists and practice managers/reception staff must all communicate effectively the same MI message. The dentist coordinates patient-focussed care and devolves various aspects of non-operative prevention and control to those dental care professionals and EDDNs whose time may be better spent working with the patient in this regard. Surgery time is the most precious and costly commodity and this core business needs to be managed at a practice level. There are an increasing number of 'MI practices' around the country that are using this model successfully, both financially as well as clinically. Local and regional networks will enable the uptake of best practice as well as communication to consolidate care delivery. The role and significance of dental payment plan specialists will surely increase as the long-term, patient-centred prevention of disease underpins their very existence.

Are 'MI' stakeholders *motivated* to change?

This is, quite literally, an emotive subject depending on the viewpoint of the stakeholder! Why does anyone want to become an oral healthcare professional in the first place? One would hope the key response would be to provide high quality, appropriate, ethical care to those in need of it. The MI care philosophy fulfils this tenet. Practitioners also need to make a living, strike an optimal work-life balance and therefore must be rewarded financially for keeping their patients healthy, as opposed to simply 'treating' disease. Industry partners work traditionally in a business where product sells, profits are made and shareholders are kept happy. Many forward-thinking dental companies, along with the British Dental Industry Association, are encouraging promotion of the MI philosophy, working together with the profession in research and development of new materials/products to promote MI care as well as offering opportunities for postgraduate professional education.

Clinical academic research is providing the evidence to support MI oral care and educators have the resources to challenge the traditional, and often outdated, views manifest in dentistry. Dental students are actively encouraged and motivated to question the traditional approaches to oral disease management. The public are becoming gradually enlightened on the benefits of a prevention-based approach to health care. Their demand and expectations for contemporary high-quality care will also fuel more long-term change. The real question is whether the regulatory bodies and the government are motivated to change.

The absolute outcome of successful MI care is difficult to measure in monetary value alone, whereas the past and current system of itemising treatments is easy to monitor, regulate and cost. However, the outcome success of MI care is evident in the improved comfort, quality of life and the socio-economic benefits experienced by those with good oral health. It is clear that significant financial investment (or redistribution of existing funding) will have to be made at the outset of implementing MI oral healthcare, with the benefits only being evident several years down the line, indeed, a political lifetime.[19-21] The socio-economic improvements in quality of life and population wellbeing are nearly impossible to measure and cost quantifiably, but have a significant part to play in the successful outcomes of MI dentistry.

Summary

With the UN Minamata Convention coming into force on the 16 August 2017, these are very exciting times for the oral healthcare profession. Changes are coming thick and fast and MI oral care is a paradigm shift underpinning these changes. In the articles in this MI-themed issue, experts have written about a series of MI-related topics, ranging from medico-legal aspects to MI restorations, business modelling for future practice to caries susceptibility assessment. The relevant stakeholders must work in partnership to move MI care forwards as the desirable goal for dentistry now and in the future. More use of public consultation by all stakeholders may be enlightening and highlight the triggers that patients will demand and expect to enable and maximise MI oral healthcare delivery. Indeed, prevention may be more appropriately termed 'engagement' to ensure stakeholders' responsibilities are fully appreciated and valued. Its careful implementation into the mainstream will bring long-lasting rewards for both patients and all oral healthcare professionals, and will lay down a secure foundation for optimising the oral and dental health of future generations. ■

DOI: 10.1038/sj.bdj.2017.644

1. Banerjee A. "MI"opia or 20/20 vision? *Br Dent J* 2013; **214:** 101–105.
2. Bernabe E, Sheiham A. Extent of differences in dental caries in permanent teeth between childhood and adulthood in 26 countries. *Int Dent J* 2014; **64:** 241–245.
3. Bernabe E, Sheiham A. Age, period and cohort trends in caries of permanent teeth in four developed countries. *Am J Public Health* 2014; **104:** e115–121.
4. World Health Organisation. Oral Health Country/Area Profile Project (CAPP). Oral Health Database. Malmo University, 2006.
5. Murray CJ, Richards M A, Newton J N *et al*. UK health performance: findings of the Global Burden of Disease Study 2010. *Lancet* 2013; **381:** 997–1020.
6. Banerjee A, Doméjean S. The contemporary approach to tooth preservation: minimum Intervention (MI) caries management in general dental practice. *Primary Dent J* 2013; **2:** 30–37.
7. Banerjee A, Watson T F. *Pickard's Guide to Minimally Invasive Operative Dentistry* – 10th ed. Oxford, UK: Oxford University Press, 2015.
8. Innes N P T, Frencken J E, Bjorndal L *et al.* F. Managing caries lesions: consensus recommendations on terminology. *Adv Dent Res* 2016; **28:** 49–57.
9. Banerjee A, Frencken J E, Schwendicke F, Innes N P T. Contemporary operative caries management: consensus recommendations on minimally invasive caries removal. *Br Dent J* 2017; **223:** 215–222.
10 Banerjee A. Minimally invasive operative caries management: rationale and techniques. *Br Dent J* 2013; **214:** 107–111.
11. Mackenzie L, Banerjee A. The minimally invasive management of early occlusal caries: a practical guide. *Primary Dent J* 2014; **3:** 42–49.
12. Green D J, Mackenzie L, Banerjee A. Minimally invasive long term management of direct restorations: the "5Rs". *Dent Update* 2015; **42:** 413–426.
13. Asimakopoulou K, Newton J T. The contributions of behaviour change science towards dental public health practice: a new paradigm. *Community Dent Oral Epidemiol* 2015; **43:** 2–8.
14. Pitts N, Melo P, Martignon S, Ekstrand K, Ismail A. Caries risk assessment, diagnosis and synthesis in the context of a European Core Curriculum in Cariology. *Eur J Dent Educ* 2011; **15:** 23–31.
15. Margherita Fontana; Sandra Guzmán-Armstrong; Andrew B. Schenkel; Kennneth L. Allen; John Featherstone; Susie Goolsby; Preetha Kanjirath; Justine Kolker; Stefania Martignon; Nigel Pitts; Andreas Schulte; Rebecca L. Slayton; Douglas Young; Mark Wolff. Development of a Core Curriculum Framework in Cariology for U.S. Dental Schools. *J Dent Ed* 2016; **80(6):** 705-720.
16. Martignon S, Marín L M, Pitts N, Jácome-Liévano S. Consensus on domains, formation objectives and contents in cariology for undergraduate dental students in Colombia. *Eur J Dent Educ* 2014; **18**: 222–233.
17. Advanced Minimum Intervention Dentistry MSc. Information available online at http://www.kcl.ac.uk/dentistry/study/distance/AMID/AMIDStructure.aspx (accessed July 2017).
18. Hill K B, Chadwick B, Freeman R, O'Sullivan I, Murray JJ. Adult Dental Health Survey 2009: relationships between dental attendance patterns, oral health behaviour and the current barriers to dental care. *Br Dent J* 2013; **214:** 25–32.
19. Curtis B, Warren E, Pollicino C, Evans RW, Schwarz E, Sbaraini A. The Monitor Practice Programme: is non-invasive management of dental caries in private practice cost-effective? *Aust Dent J* 2011; **56:** 46–55.
20. Schwendicke F, Stolpe M, Meyer-Lueckel H, Paris S, Dorfer C E. Cost-effectiveness of one- and two-step incomplete and complete excavations. *J Dent Res* 2013; **92:** 880–887.
21. Schwendicke F, Paris S, Stolpe M. Cost-effectiveness of caries excavations in different risk groups – a micro-simulation study. *BMC Oral Health* 2014; **14:** 153.