appliance is often referenced with regard to supra-eruption, however, this can also be misleading. Bereznicki *et al* refer to a review of the Dahl concept by Poyser *et al* *'the time to achieve intrusion/extrusion of teeth to a new, desired vertical dimension is considered to range from one to 24 months, with continuous 24 hour a day wear of an appropriate, suitably designed appliance. The Dahl appliance is designed to be bonded in the patient's mouth and worn 24/7 with all teeth except those in contact to never be in any function. The idea is to supra-erupt the posterior teeth during a restorative phase of treatment. This is not the same as a patient using a night time splint for a few hours'.*[3,4] The research by Kinoshita *et al* would also suggest that teeth are unlikely to supra-erupt.[5]

The authors have a section on SCi™. It may have been prudent for the authors to speak to us at S4S about this, considering our involvement as distributors of the mass produced splint and manufacturers of the custom-made SCi™. The SCi™ is still called NTI-tss in all countries outside of the UK. The SCi™ (Trademarked in UK) is available as a 'chairside or surgery fitted' device. This is a mass produced splint that generally covers the anterior teeth. The SCi™ can cover full arches and both arches, if required.

Furthermore, with regard to the SCi™ section, the authors suggest that the device works by stimulating the periodontal ligaments, assuming proprioception. On the contrary, the SCi™ devices are still effective during sleep when there is no proprioceptive feedback during certain phases of sleep.[6]

The authors go on to suggest that the SCi™ device is normally used on the maxillary teeth. In fact, the manufacturer and inventor, J Boyd and others, who teach the fitting of these appliances, suggest that the default is to fit the device on the lower arch. There are reasons why this is suggested and, of course, there are exceptions.

The authors mention occlusal changes in regard to the SCi™ and reference the Stapelmann and Türp literature review as if to suggest to the reader that the research proves the appliance causes occlusal changes, when in fact the review suggests that 'such devices' may be successfully used for the management of bruxism and TMDs.[7] However, to avoid potential unwanted effects, it should be chosen only if a patient is sure to be compliant with follow-up appointments. There are many references to occlusal changes with other full arch occlusal splint use.[3,8,9]

The authors *say 'Due to its size it is susceptible to being swallowed or inhaled'*. This is a dangerous statement. The device, which is CE marked and FDA approved, has regulations and rules to follow. If there are any adverse events they must be reported via MAUDE, the agency that investigates medical devices and drugs that have side-effects. (**https://www.accessdata.fda.gov/**). A search of MAUDE reveals that there have only ever been four adverse events reported. None of the events relates to inhalation or swallowing. Considering that there have been perhaps more than 10 million NTI-tss/SCi devices fitted since the 1990s, it is not correct to say that they are 'susceptible to being swallowed or inhaled'.

The authors may not be aware of the research by Blumenfeld *et al*.[10] Results from 512 dentists, reporting on 78,111 NTIs fitted, showed 98.1% patients wore the device with no problems, 1.6% had bite changes and 0.3% claimed aspiration. There were no reported cases of aspiration verified by radiographs. The figure of 0.3%, even if they were confirmed reports, does not suggest that they are *'susceptible to being swallowed or inhaled'.*

In summary, the article makes assumptions based on the authors' own opinions. This can lead the reader to believe that myths exist on the subject of occlusal splint therapy, leading to increased confusion and frustration.

References

1. Baad-Hansen L, Jadidi F, Castrillon E, Thomsen PB, Svensson P. Effect of a nociceptive trigeminal inhibitory splint on electromyographic activity in jaw closing muscles during sleep. *J Oral Rehabil* 2007; **34**: 105–111.
2. Becker I, Tarantola G, Zambrano J, Spitzer S, Oquendo D. Effect of a prefabricated anterior bite stop on electromyographic activity of masticatory muscles. *J Prosthet Dent* 1999; **82**: 22–26.
3. Bereznicki T, Barry E, Wilson NHF. Unintended changes to the occlusion following the provision of night guards. *Br Dent J* 2018; **225**: 715.
4. Poyser NJ, Porter RWJ, Briggs PFA, Chana HS, Kelleher MGD. The Dahl Concept: past, present and future. *Br Dent J* 2005; **198**: 669.
5. Kinoshita Y, Tonooka K, Chiba M. The effect of hypofunction on the mechanical properties of the periodontium in the rat mandibular first molar. *Arch Oral Biol* 1982; **27:** 881–885.
6. Lund S, Broberg C. Effects of different head positions on postural sway in man induced by a reproducible vestibular error signal. *Acta Physiol Scand* 1983; **117**: 307–309.
7. Stapelmann H, Türp JC. The NTI-tss device for the therapy of bruxism, temporomandibular disorders, and headache – Where do we stand? A qualitative systematic review of the literature. *BMC Oral Health* 2008; **8**: 22.
8. Todd MA, Freer TJ. Anterior open bite as a complication of splint therapy. *Aust Orthod J* 1994; **13**: 164.
9. Magdaleno F, Ginestal E. Side effects of stabilization occlusal splints: a report of three cases and literature review. *Cranio* 2010; **28**: 128–135.
10. Blumenfeld A, Bender SD, Glassman B, Pinto A. Patterns of use for an enhanced nociceptive trigeminal inhibitory splint. *Inside Dentistry* 2011; 7.

Matt Everatt

Technical Director

S4S Dental & Smilelign UK

Authors' Response

We thank Mr Everatt for his letter criticizing our article. His concerns relate to our description of anterior bite plane type splints in general and to the use of the SCi splint in particular.

It was not the purpose of the article to criticize or promote any particular splint. Similarly, it was not the purpose of our article to describe in detail features of any particular splint. We recognize that the SCi product range includes a wider variety of splints than the type mentioned in the article. We are grateful to Mr Everatt for highlighting that, although SCi splints are relatively small, there have been few if any cases of SCi type splints having been swallowed or inhaled.

The purpose of the article was to describe different types of splints (classifying

them by the way they made contact with opposing teeth) and to examine the evidence relating to their effectiveness in managing bruxing and TMD.

We acknowledge that any unreferenced opinions included in our article are just opinions, however our conclusions are based on best evidence including systematic reviews.

Our conclusion in respect of bruxism was that the effects of splints on bruxism are not well understood. The article notes studies showing variable individual responses to splints. Reference was made, however, to a study that showed SCi had a strong inhibitory effect on clenching compared to a stabilizing splint.

Our conclusion in respect of use of splints for TMD was that there is no evidence for the therapeutic superiority of any form of splint. Practitioners must be aware of the relative advantages and disadvantages of different types of splint. Part-contact splints in particular can produce occlusal changes in some patients. Follow-up appointments for all patients who have been provided with occlusal splints should include assessment of the occlusion to ensure that there are no adverse changes.

Robert Jagger, Consultant in Restorative Dentistry, Bristol Dental Hospital

Elizabeth King, Consultant in Restorative Dentistry, Morriston Hospital, Swansea

Case report: missed mandibular fracture

A 41-year-old patient attended the A&E department with pain and swelling following an attempted extraction of his lower left second molar by his dentist. The patient was being treated for a suspected combined periodontal-endodontic lesion on the mesial root of the LL7 (Figure 1). He presented to A&E in considerable pain. There was intra-oral swelling in the left posterior buccal region and extra-oral swelling and tenderness around the left border of the mandible. The LL7 was in supraocclusion, grade 1 mobile, tender to bite on, and there was a newly developed anterior open bite. An OPG taken in hospital confirmed a displaced left body of mandible fracture (Figure 2). The patient underwent an open reduction and internal fixation procedure under general anaesthetic to reduce the fracture and restore function.

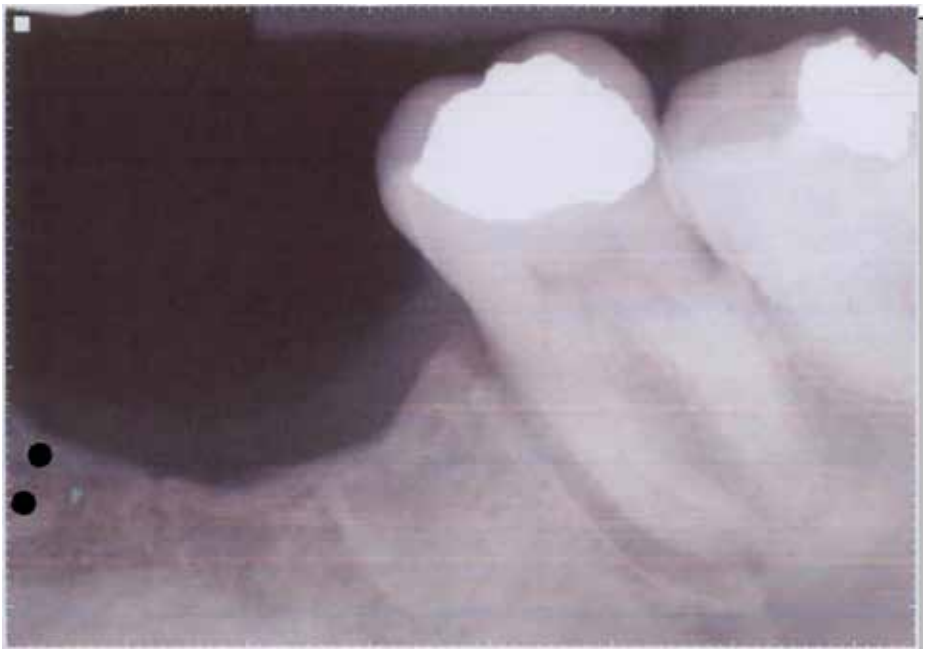

Figure 1. Pre-operative periapical radiograph.

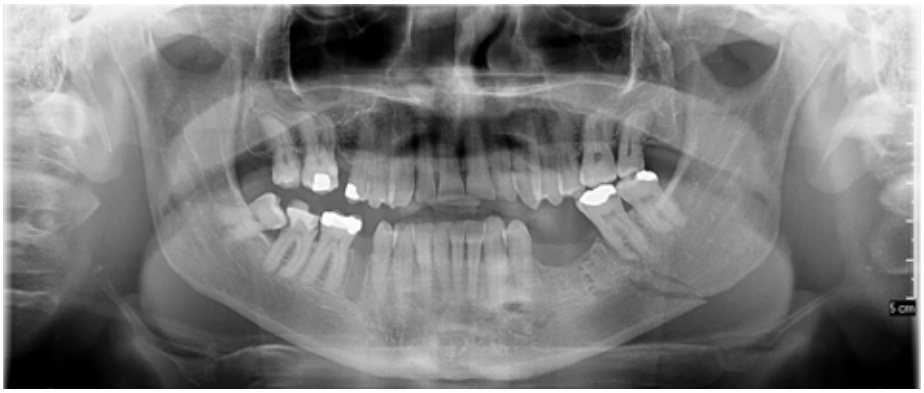

Figure 2. OPG radiograph.

Interestingly, the patient reported no history of trauma to the face or mechanical falls, and was unaware how a fracture could have occurred. Medically, he had no history of bone disease. Blood results including bone profile and parathyroid hormone tests came back within normal range, and there were no obvious bony deficits on the OPG. The attempted extraction is an unlikely cause, as cases of iatrogenic fractures are rare, with an incidence ranging from 0.0034% to 0.0075%,[1] with third molars being the most commonly associated. This case highlights the difficulties general dental practitioners face when having to diagnose emergency patients in pain without an OPG machine accessible to them. There is perhaps a need for increased awareness of the signs and symptoms of mandibular fractures among dentists in primary care.

References

1. Joshi A, Goel M, Thorat A. Identifying the risk factors causing iatrogenic mandibular fractures associated with exodontia: a systemic meta-analysis of 200 cases from 1953 to 2015. *Oral Maxillofac Surg* 2016; **20**: 391–396.

Jenny Girdler

DCT in Oral and Maxillofacial Surgery

Aintree University Hospital, Liverpool