

Contemporary Tooth Wear Management

“As our knowledge and understating of occlusal concepts and adhesive dentistry has evolved, it has become possible to provide restorative care for patients with TW in a more predictable manner and a less invasive approach than was previously possible”



Shamir Mehta
King's College London Dental
Institute
United Kingdom

Shamir Mehta* and Subir Banerji

King's College London Dental Institute, London, United Kingdom

COLUMN ARTICLE

With an aging Western population often retaining their natural dentition into advanced years (that may have concomitantly been subjected to multiple courses of restorative dental care), with teeth also being exposed to dietary and lifestyle changes that have taken place in more recent times, the irreversible loss of dental hard tissues (by causes other than dental caries, trauma or developmental conditions) - often termed 'Pathological Tooth Wear' (TW) is a common condition encountered in dental practice. Due to the lack of symptoms, many patients will be unaware of the presence of this condition, and therefore may not seek care until the disease may have reached advanced proportions.

Successful management of TW includes:

- Careful assessment and diagnosis, which is often challenging due to the multifactorial aetiology.
- Developing patient awareness.
- An effective preventative strategy.
- Protection of further loss of tooth tissue.
- An effective maintenance and recall protocol.

Historically, restorative care has involved the use of *conventionally retained indirect restorations* – (crowns and onlays -especially for the management of worn posterior

teeth), often also involving the use of diagnostic splint therapy to assess tolerance to any proposed occlusal changes. However, as our knowledge and understating of occlusal concepts and adhesive dentistry has evolved, it has become possible to provide restorative care for patients with TW- in a more predictable manner and a less invasive approach than was previously possible.



Figure 1: Pre-operative view.

An example of the above is shown by the case of Patient A (Figure 1); a 42-year-old male who had been referred with symptoms of thermal sensitivity from his lower left first

molar tooth from localised pathological anterior maxillary tooth wear. He was also aware of his wearing anterior teeth, with concerns relating to the longevity of his dentition. Following a process of history taking and the undertaking of clinical evaluations, a diagnosis of pathological tooth wear was established (with attrition and erosion being the main aetiological factors). Effective preventative care had already been instituted at this stage.

Study models were fabricated and mounted on a semi-adjustable articulator. It was evident that due to the inadequate intra-occlusal clearance, placement of any restorative materials in a predictable manner without either involve:

- prescribing tooth reduction,
- placing localised material in supra-occlusal positions,
- or, by undertaking a full mouth rehabilitation -involving an overall increase in the Patient's occlusal vertical dimension.

Following occlusal assessment and an evaluation of the Patient's eruptive potential it was decided to adopt the least 'invasive' approach and adhere materials in a localised manner only on those teeth which exhibited pathological tooth wear. Consequently, these isolated restorations were placed in supra-occlusion -to enable a phenomenon often referred to as the 'Dahl Concept' or 'Relative Axial Movement'.

In order to determine the aesthetic and functional endpoint, a direct intra oral diagnostic mock-up was carried out, involving the placement of tooth coloured resin composite materials (without any tooth conditioning for adhesive bonding) to assess changes in the morphology of the Patient's teeth. The latter provides a controlled and bespoke approach for planning of the final contours, without undue reliance on the biometric principles of shape and proportion. Photographs and impressions were taken of the mock up. A laboratory fabricated diagnostic wax up was produced according to the intraoral diagnostic mock up prescription.

There is a distinct clinical advantage to establish the patient's adaptive potential in a reversible manner. Hence, it was decided to use direct resin composite to restore the worn teeth. The occlusal vertical dimension was therefore increased to a level so as to provide adequate space required for the subsequent definitive restorations (Figure

2). The use of direct resin composite can provide an aesthetically acceptable solution which can offer the merits of; *low cost, tooth conservation (including possible reversibility), ease of adjustment and repair*. The laboratory wax-up involved the addition of the wax to the teeth with pathological tooth wear providing an occlusal prescription that would allow for even anterior guidance in protrusion and a canine guided left and right lateral excursion with posterior disclusion. A prescription referred to as a "*mutually protected occlusion*".



Figure 2: Diagnostic wax-up.

Upon return of the wax up for the laboratory, a silicone index was made. This was used to apply provisional crown and bridge material to the worn surfaces. This secondary 'intra-oral mock up' provides a more refined outcome than the previous one and help's to verify the accuracy of the wax up both aesthetically and functionally. In addition, it may help to attain informed consent (as the wax-up would be used a guide to providing definitive care).

Following the attainment of Patient consent, a silicone key was prepared which would help to 'copy' the palatal-occlusal prescription of the wax up and also permits the layered approach to resin application (which has established merits). Figure 3, depicts the presence of the key *in situ*. A direct composite onlay was also applied to the LL6 to help

with the acute management of the Patient's symptoms at this tooth, as well as to also avoid the loss of intra-occlusal clearance following tooth movement. *All treatment was provided without any tooth reduction.*



Figure 3: Silicone key Index in situ.

After a period of 8 weeks, where the Patient had reported satisfaction with the newly placed restorations (Figure 4a-c) and the adaptive potential was confirmed, the composite onlay at the LL6 was substituted with an indirect adhesive Type III gold adhesive onlay (provided with minimal preparation) - this can be seen on Figure 5. Figure 6 provides a view of the occlusal prescription at present. At review the re-established occlusal contacts are checked and verified by using Shim stock foil. In most cases this process takes from between 4 weeks to 3 months as shown by numerous clinical studies.



Figure 4a: View after resin application and gross polish.



Figure 4b: Gloss polish; post-op views.



Figure 4c: Post-operative views; resin added with tints to mask staining and mimic hypoplastic areas, resulting in a desirable smile. No tooth preparation required.



Figure 5: Adhesive gold onlay at LL6.



Figure 6: Centric stops marked for supra-occlusal restorations; shared anterior guidance and canine guidance was also provided.

CONCLUSION

In conclusion, this case illustrates the use of adhesive dentistry and current occlusal concepts to treat difficult and demanding conditions such as tooth wear in a minimally invasive and predictable manner. In this way all functional and aesthetic changes are carefully controlled with an important reversible stage in the treatment to confirm patient consent and adaptability. Retention of tooth tissue has its obvious advantage in the long term management of this condition.

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