Tooth Wear Occlusion and Splints

Coursebook to accompany the hands-on course

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An outline of tooth wear management

Tooth Surface Loss (Tooth Wear) is an increasing problem and needs to be identified early to enable preventative measures to be put in place. TSL includes all forms of loss of tooth material not due to disease of bacterial origin (ie. caries) and is usually considered to be:

- Attrition
- Abrasion
- Erosion
- Fractures
- Developmental defects

Dentistry should also be added to the list as we, as a profession, often cut bits off teeth!

Always look for it at patient examination using loupes (eg 3x magnification), bright light and dry teeth. Establish a diagnosis then formulate a plan. The TSL can be monitored using photographs, study models, indices or charts. Check these are dated. The general plan is to apply prevention, monitor and avoid restorative treatment where possible. Active intervention should be non-invasive where possible to prevent further tooth loss.

Principles of management:

1. Determine if there is tooth wear – look in the obvious places
2. Determine the cause(s)
3. Apply prevention and immediate therapy if necessary
4. Monitor the rate of loss (should be low if aetiological factor eliminated)
5. Intervene with restorative procedures only if necessary to restore aesthetics and/or function. Minimal intervention where possible.
6. Decide if localised or generalised. If **localised** then replace what is missing and allow occlusal adaptation to readjust the occlusion on the other (non-worn teeth). For **generalised** wear build up all teeth to prevent loss of space due to overeruption and occlusal adaptation.
7. Is the occlusion correct (use ICP) or not (use CR and distalise).
8. Monitor and maintain

The aim of immediate therapy:

- Relieve sensitivity, cover sharp edges
- Identify aetiological factors, form diagnosis, start prevention of further loss
- Protect remaining tooth structure

Examples include:

Diet analysis, counselling, tooth brushing advice, control aetiological factors.

Prescribe a sodium fluoride mouth rinse to be use daily to help with sensitivity, consider desensitising tooth paste and gels (ToothMoose, GC) in a close fitting soft occlusal splint

Reassessment

After initial therapy a period of time should lapse to allow for assessment of the patients response to the initial therapy. Review symptoms. Monitor rate of loss.

At this stage the patient's views and expectations should be considered and treatment plan finalised.
Consider treatment options: minimal or traditional (preparation). Consider materials and longevity. Consider the occlusion and how to manage it.
There is increasing support of the view that once diagnosed, progression of tooth wear is slow, if preventive advice has been successfully implemented. Restorative intervention may not be necessary.

Monitoring
This is an essential component of management. Evidence of monitoring should be included in patient records for medico-legal purposes and to protect against claims of 'supervised neglect'.
Take baseline measurements at initial examination, including charting
Monitor rate of progression using:
study models (high density stone), intra-oral photographs, putty index sectioned across area of wear.
All records should be named and dated.
These methods are crude but they are all we have available at present in general practice. In time, digital scanners may enable more accurate monitoring.

Basic Erosive Wear Examination(D Bartlett, BDJ 2010; 208: 207-209)
A recently proposed screening tool devised by a group of clinicians from UK, Switzerland and Germany. Based on similar concepts to the BPE. A simple scoring system which gives an indication of the severity of wear, allows screening, recording and monitoring.
Clinical sequence when using BEWE:

1. Diagnose presence of tooth wear(excluding trauma, developmental defects)
2. Examine all teeth and all surfaces for wear
3. Identify in each quadrant the most severely affected tooth with wear
4. Record cumulative BEWE score

Results are recorded in patient notes in grid style, similar to BPE.
Cumulative score is matched to a list of interventions which can assist in management

Criteria for grading wear:

Score	Features
0	No erosive tooth wear
1	Initial loss of surface texture
2	Distinct defect, hard tissue loss<50% of surface area
3	Hard tissue loss >50% of surface area

The concept of the BEWE is still in the early stages and is not yet widely adopted in clinical practice.

First step in management is prevention

After pathological tooth wear has been diagnosed the clinician needs to apply a prevention plan. This can then be monitored along with future levels of tooth wear. Ideally the tooth wear will be stabilised and no further intervention will be required.

In some cases the tooth wear progresses despite prevention being in place. In other cases the wear can be so severe at the initial presentation that intervention is required.

Restorative Intervention and Long Term Management

The treatment options are:

Review and monitor provided no significant, aesthetic, functional, occlusal or sensitivity problems then close monitoring is acceptable. Be sure that the rate of wear is not such that problems are likely later. Exposed dentine should normally be covered.

Restorative treatment – based on aesthetic, functional, occlusal requirements. Aim to add to teeth, do not cut more off, protecting and conserving the remaining tooth structure. Replace what is missing. Replace what is missing is the key. Bond to enamel. Add composite.

Decide if the wear is localised or generalised.

If **localised** then replace what is missing in those areas and allow those teeth to intrude and the other teeth to extrude to correct the occlusal (occlusal adaptation). If building up anterior teeth then aim for distalisation too. Distalisation atkes about 2 weeks. Movement after that is occlusal adaptation ("Dahl"). IF the patient does not like the posterior space then, after distalisation then build up the centric stops on the posterior teeth with a softer material eg flowable composite or GIC.

If **generalised** then replace what is missing in those areas and the occlusion will be on all theeth. A small element of intrusion and extrusion will go to to further rcorrect the occlusion (occlusal adaptation). There is unlikely to be distalisation as the posterior teeth as in contact. If you want distalisation in a generalised wear case then do the anterior teeth first, allow 2 weeks for ditalisation then restore the posteriors.

Do not allow worn teeth to over-erupt ("Dahl") as you lose the restorative space and may need to cut already worn teeth, not an acceptable idea..

Anterior tooth wear

Anterior teeth often require veneering, usually with direct composite, which can also be placed palatally to establish the anterior occlusion, move the mandible posteriorly towards RCP, rather like a Lucia jig, or to prevent further palatal erosion. Labial veneers are used to provide aesthetic restoration but can also prevent further erosion. These can be ceramic or composite. Use minimal preparation if possible to maintain enamel.

The anterior composite restorations need to do several things:

1. Protect the teeth from further wear
2. Improve the occlusion
3. Improve aesthetics

We will be doing anterior veneers that correct the occlusion and aesthetics during the hands-on sessions.

The starting point with anterior wear is to establish the position of the incisal edge to improve the aesthetics. This is part of what we call smile-design as we are not copying the existing teeth but rather creating a new smile.

I hope you found this webinar helpful. Understanding smile design techniques will be useful for other situations, not just tooth wear cases, where you want to improve the aesthetics with dentures, ceramics, implant retained restorations, etc.

For anterior wear cases we recommend the use of direct composite as it is a simple procedure that works well. There is no risk as it can only fall off at worst. As it is softer than teeth it will grind itself in as the occlusion changes. It can be modified by the clinician to alter the aesthetics as necessary.

Direct composite can be applied in two ways:

1. Direct placement by freehand
2. Using a matrix

See: Lewis M, Thayer T, Ali R. (2026). Interventions for tooth wear – is there a ‘best' way? *British Dental Journal* 240, 459–464

Method 1 requires some skill but is the quickest and easiest, lowest cost method to get an instant improvement. It enables me to protect teeth quickly, get the occlusion sorted out right away, improve aesthetics in a single visit. At the review stage, possibly 3 months later you can move on to upgrade these initial composites to bettr composites, ceramics etc.

Method 2 requires a matrix which is made from a diagnostic wax-up or digitally designed printed model. So the starting point has to be smile design to generate the diagnostic model. From this a matrix is made which can be an Essix type or a clear silicone mould. There are many designs for this from a simple silicone mould to a rigid clear outer/soft clear inner with a putty border.

We will be doing both methods on the hands-on course.

Method 1 requires more chairside skill so we have a webinar to help you with this.

Method 2 requires attention to a few keypoints will we cover in the hands-on session.

Posterior teeth

Posterior teeth usually require occlusal protection against further attrition, erosion or fracture. Protection from erosive factors, usually gastric acid, can be provided with composite. If attrition/bruxism is a factor then consider the occlusal metal overlay, ideally with 1mm thick gold. Think of the occlusal surface only of a gold crown bonded onto the tooth. This could be an indirect composite but requires 2mm thickness.

Indications for metal overlays:

- Worn posterior teeth, cuspal coverage for cracked tooth syndrome or protection after RCT
- Short or overtapered clinical crowns
- Bruxists

The principals of tooth preparation should allow good occlusal coverage with the replacement non-bondable restorations with composite. The occlusal reduction should provide sufficient material for rigidity based on a clearance of 0.5 - 0.7 mm (unless placed in “high” for a “Dahl” effect). The onlay is extended 0.5 - 1.0 mm below the occlusal reduction, except for the area of the contact point. At the contact point, the

extension should stop above this area by sufficient distance to allow the technician to separate the die and gain access to the margin for waxing. This extension serves to provide a bracing action if used for “cracked tooth syndrome”, and provides a positive seating for cementation.

The marginal finish should be clear for the technician and can either be a rounded shoulder or chamfer of about 0.3mm reduction. This margin should be in enamel. Onlay may be constructed in either gold or other alloy and should be sandblasted prior to bonding.

An alternative would be a zirconia crown – ideally minimal thickness with a vertical margin so that it is conservative to avoid damaging an already worn tooth. We will cover the VertiPrep during the hands-on course.

For missing cusps consider composite direct or indirect to replace what is missing. These techniques require the use of adhesive bonding, good moisture control and up-to-date techniques and materials.

Patients with attrition/bruxism will often require protective splints. More on this when we meet-up.

Intervention Treatment Summary:

Decide:
Is intervention needed or would prevention of further damage be sufficient?
Is the wear localized or generalized?
Is the OVD reduced?
Has the patient postured anteriorly to move ICP further away from CR?
Is there alveolar compensation?

Where damage is to anterior teeth only:
This is localized wear and a good plan is to build up anterior teeth to replace what is missing and allow other teeth to erupt back into occlusion.

Eg. dietary erosion to labial –
- do you need incisal extension?
- composite mock-up?
- try freehand composite veneers
- consider indirect composite or ceramic veneers (try to avoid further tooth reduction)
- Dahl if required to regain OVD

gastric erosion to palatal
- palatal composite veneers, direct or indirect
- Dahl to regain OVD

incisal wear only, eg attrition or attrition/erosion
- freehand incisal composite, often Dahl type.

Where damage is to posterior teeth only, eg. ruminants:
- Composite to replace what is missing, Dahl if necessary
- Metal overlay

*Where damage is to all teeth: Us*e combination of above but add composite to all teeth to regain OVD. Dahl usually not needed. Where lack of teeth present consider partial denture plus overdenture abutments on the very worn teeth.

Management summary for generalized wear

1 add 2mm of composite to lower anterior teeth, wait 2 weeks for distalisation to occur

2 add 2mm of composite to lower posterior teeth, this should be flat.

3 add 2mm of composite to upper anterior teeth palatal surfaces, often also extending incisally and labial to restore aesthetics, wait 2 weeks

4 add 2mm of composite to upper posterior teeth

5 review at 3 months to repair/reassess/resurface/re-treatment plan if necessary for indirect restorations

Future Study Options

As you know Blended Learning (BL) combines modalities of online content (webinars, seminars, tutorials, QA sessions, readable content, video) and face-to-face (F2F).

We provide CPD in various formats starting with 90 min webinars on:

Dam it, it really is easy - rubber dam techniques: showing clearly the kit you need, how to set it up, several ways to do the dam application and many tips to make it work well..

Making contact - better posterior composites with a focus on making better proximal contacts, dealing with the subgingival margin, getting the occlusion correct.

Occlusion not confusion - Assessing the occlusion quickly and going on to fix basic problems (tooth wear, cracked tooth syndrome, TMJ pain).

TMD – what a pain - managing this very common condition from first visit help through to splint treatments.

Break the habit, not the teeth: manage your bruxists – including using the correct splint

Wear is the problem - Simple effective interventions for treating tooth wear, correcting the occlusion and restoring aesthetics.

New for 2027:

1. Injection moulded composites
2. The VertiPrep

We also run one days hands-on courses around the UK.

Our flagship is the Masters level Fixed and Removable Prosthodontic (FRP) programme aimed at training BDS level dentists to high-end private practice standards. At KCL we run FRP, the world's biggest (140 dentists at any one time) prosthodontics programme, now in its 26th year. It is blended with online and a 10 day block of F2F which can be taken in London or Dubai and regularly gets 100% satisfaction scores.

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