A conservative mixed material approach to full mouth rehabilitation for severe erosive tooth wear

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Introduction

Tooth wear ranks among the leading causes of dental hard tissue damage, second only to dental caries. Tooth wear prevalence is rising in both frequency and severity, even as caries rates continue to decline.[1] Although global estimates remain difficult to establish due to inconsistent diagnostic criteria and study methodologies, erosive tooth wear (ETW) is widely perceived to be increasingly common in contemporary populations.[2] ETW results from the softening of enamel by intrinsic or extrinsic acids[2,3] and can significantly accelerate structural loss when combined with mechanical forces such as attrition and abrasion.[3,4] Parafunctional habits—most notably bruxism—further compound this process, often leading to complex patterns of generalized wear that challenge both function and aesthetics.

Effective management requires a careful balance between restoring occlusal stability, improving appearance, and preserving remaining tooth structure. Minimally invasive, adhesive-based strategies have therefore become central in modern treatment planning. This case report demonstrates a conservative, adhesive-based rehabilitation approach that integrates both direct and indirect adhesive restorations to achieve functional, durable, and aesthetic outcomes while respecting the principles of maximal tissue preservation.

Case report

A young adult woman visited the dental practice with the chief complaint of functional impairment and aesthetic concerns due to advanced tooth wear (Fig. 1). From her history, she had high acidic dietary exposure and bruxism, daytime and nocturnal. Clinical findings showed generalised severe tooth wear displaying clear erosive and attritional components (Figs. 2-3). The combination of erosive softening and attrition worsened the tooth wear, resulting in short clinical crowns and a flattened smile curvature. The dentition showed extensive erosive substance loss, highlighted by pronounced occlusal cupping and distinct incisal grooving. Several restorations appeared "raised," reflecting the progressive loss of surrounding tooth structure, while broad, flattened buccal enamel lesions further indicated advanced wear. Notably, the amalgam restorations were shiny and untarnished, a finding

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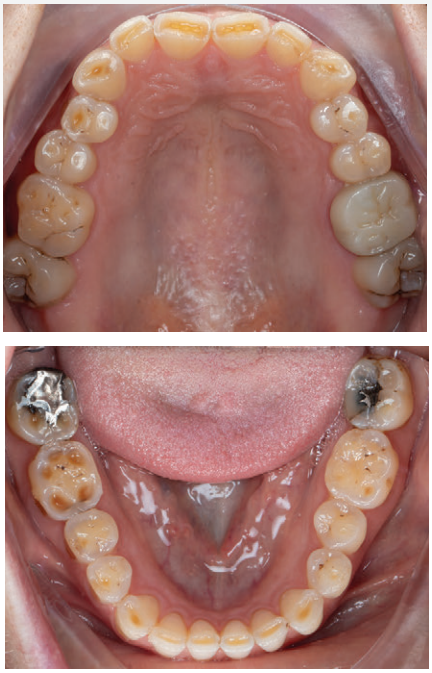
Fig 1: Extraoral front view before treatment. The shortened and flattened upper anterior crowns significantly affected the patient's smile aesthetics and contributed to a notable psychological burden.



Figs 2a & 2b: Intraoral view before treatment: incisal grooving and occlusal cupping indicate a strong erosive component. Note that the right side is more affected than the left side, which might indicate an habitual asymmetric occlusal loading. Amalgam restorations appear shiny and untarnished, which might indicate an acidic environment.

Figs 3a, 3b & 3c: Intraoral buccal view before treatment. Wide and flattened erosive areas can be seen on the buccal surfaces.

that may be linked to prolonged exposure to an acidic oral environment. Other non–wear related findings included multiple failing restorations, among them a full coverage crown on tooth 26 that required replacement. Overall, the presence of an acidic diet combined with parafunction constituted significant contributing risk factors.

Treatment objectives and rationale

The primary treatment objectives were to restore both function and aesthetics while protecting the remaining tooth structure through a minimally invasive approach. A controlled increase in occlusal vertical dimension (OVD) was planned, carefully tailored to the patient's tolerance to ensure comfort and functional stability. Maintainability and reparability were also key considerations, guiding the choice of materials and restorative strategies. To achieve these goals, a predominantly additive treatment plan was selected to preserve the residual enamel and dentine. Direct composite resin was prioritised for its conservative nature and ease of repair, complemented by indirect restorations in high load posterior regions. A single zirconia crown was selected to restore the structurally compromised molar, allowing for a conservative vertical preparation.[5] This material choice supported a minimally invasive approach while providing the strength and longterm durability required for posterior function.

Treatment overview

The full mouth rehabilitation was carried out at an increased OVD using a predominantly additive approach. The length of the anterior teeth was tested via an intraoral mockup (Fig. 4). Treatment began with the upper and lower anterior teeth, completed on the same day. To maintain the newly established vertical dimension during this phase, posterior occlusion was stabilised with temporary composite occlusal stops.

A combined protocol using Gænial A'CHORD (GC) and Gænial Universal Injectable (GC) was employed for the anterior restorations. A bilaminar technique was followed: a palatal stent was used to create an initial shell, followed by a dentine body layer (both Gænial A'CHORD), and a final enamel layer applied

Fig 4: Facially driven workflow: Intraoral mock-up to test the length of the anterior teeth

through injection moulding with Gænial Universal Injectable (Fig. 5).

Four days later, the upper premolars and molars were restored using an injection moulding technique with Gænial Universal Injectable, followed by the lower premolars ten days thereafter. The lower left quadrant was rehabilitated with semi-indirect composite onlays fabricated via injection moulding using Gænial Universal Injectable (Fig. 6), providing a balance of tooth preservation, cost effectiveness, and long term repairability.

Ten days later, the upper left first molar was restored with a zirconia crown placed following a vertical preparation, offering durable reinforcement for a strategically important posterior tooth.

Finally, lithium disilicate onlays (Initial LiSi Press, GC) were placed on teeth 46 and 47 to deliver enhanced strength and predictable adhesive performance in an area subject to high occlusal loading. These restorations were completed three months later due to patient-related scheduling constraints.

Adhesive and isolation protocol

All direct composite procedures were undertaken under rubber dam isolation to ensure optimal control of the operative field and maximise adhesive reliability. A combined layering strategy was employed, in which conventional paste composite was used for dentine and enamel replacement, while injection moulding techniques were incorporated to refine final contour, improve precision, and streamline the workflow.

Adhesive protocols were followed according to manufacturer instructions, with substrate specific conditioning and bonding procedures applied to ensure durable interfaces across both direct and indirect restorations. Direct restorations were bonded with G-Premio BOND (GC).

Indirect composite restorations fabricated with Gænial Universal Injectable were gently sandblasted with 27µm aluminium oxide and cleaned with alcohol before being silanised with GMulti PRIMER (GC). The Initial LiSi Press restorations underwent alcohol cleaning, 20-second hydrofluoric acid etching, and subsequent silanisation with GMulti PRIMER. Prepared tooth surfaces were cleaned and lightly air abraded, followed by selective phosphoric acid etching and application of

Fig 5a, 5b & 5c: A bilaminar technique using Gænial A'CHORD (GC) and Gænial Universal Injectable (GC) as the final layer was employed for the anterior restorations. All adhesive procedures were carried out under rubber dam.

Figs 6a & 6b: Semi-indirectly prepared injection moulding restorations reduce chair time while making finishing easier.
a: Gænial Universal Injectable restorations on a printed model.
b: teeth were isolated and gently sandblasted prior to luting.

Fig 7: Occlusal view of the lower arch. The Initial LiSi Press restorations were not veneered, resulting in an exceptionally smooth, highly polished surface that maintains excellent aesthetics.

GCEM ONE Adhesive Enhancing Primer. Final cementation for all glass ceramic and composite restorations was performed using GCEM ONE (GC).

The zirconia crown was likewise cleaned and lightly sandblasted prior to cementation with GCEM ONE, ensuring a reliable bond to the highstrength ceramic substrate.

Occlusion and vertical dimension

The occlusal vertical dimension (OVD) was increased in a controlled manner, allowing ongoing assessment of the patient's phonetics, comfort, and functional adaptation. The new OVD was established through a facially driven workflow that defined the ideal incisal edge position, with subsequent refinements guided by the patient's functional response. Given the determined interocclusal space and the patient's bruxism, a more conservative occlusal anatomy was adopted to reduce interferences or chipping. In the posterior region, the priority was durable function rather than aesthetics, so the occlusal surfaces were meticulously polished and left unglazed to minimise wear[6,7] (Fig. 7). The final occlusal scheme provided stable bilateral posterior contacts supported by an anterior guidance that effectively limited posterior interferences during excursive movements. This configuration respected the patient's functional envelope while promoting a predictable and comfortable occlusal relationship.

Outcomes

Following completion of treatment, the patient demonstrated a stable occlusion at the newly established OVD (Fig. 8). The additive, minimally invasive approach successfully preserved existing tooth structure while providing comprehensive coverage of worn surfaces. Aesthetic outcomes were enhanced through harmonised anterior composite layering (Figs. 9-10), and posterior morphology was effectively restored using direct, indirect

Figs 8a, 8b & 8c: Intraoral buccal view after treatment.

and semi-indirect restorative modalities. The predominance of composite in the rehabilitative strategy supports longterm maintainability, as composite materials allow straightforward polishing, repair, and the option for staged restorative refinement if required.

Maintenance and risk management

The long term success of the rehabilitation was supported by a tailored maintenance programme. The patient received

Fig 9: A natural surface morphology and texture were restored after treatment.

Figure 13: Four months after treatment, the restorations fit well into their natural environment.

counselling on dietary modifications aimed at reducing erosive challenges, as well as behavioural guidance to address parafunctional activity associated with bruxism. Protective therapy included ongoing use and periodic adjustment of an occlusal appliance to mitigate excessive loading on the restorations. Regular professional reviews were scheduled to provide hygiene support, monitor the patient's adaptation to the increased OVD, and maintain the integrity of adhesive interfaces, including polishing or repairing composite surfaces as needed.

Discussion

This case demonstrates that conservative, adhesive-based full-mouth rehabilitation can effectively address severe erosive tooth wear while preserving tooth structure. Materials were carefully selected based on their respective indications. Most of the rehabilitation was completed using composite resin, chosen for its minimally invasive nature, cost efficiency, and excellent repairability, which makes it particularly suitable for long term maintenance in a young patient. A fullcoverage zirconia crown was placed on tooth 26 to allow minimally invasive vertical preparation and provide the strength and durability required to restore this structurally compromised molar. In contrast, the partial restorations in the lower right quadrant were fabricated in lithium disilicate, a material selected for its reliable adhesive bonding performance and favourable strength profile, offering an ideal balance between conservation of tooth structure and functional longevity.

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