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Performance and Failure Analysis of a Glassionomer-Based Restorative System at 12 Years

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Objectives The aim of this study is to evaluate the clinical performances of a glassionomer-based restorative system when used in single surface and multiple surfaces permanent dental restorations (molars and premolars) and cervical restorations (all teeth), evaluating the reasons of failure and/or replacement.

Methods 3 experienced operators with minimum 5 years of clinical experience in restorative treatments were selected in 2007 and trained before the beginning of the study. The EQUIA restorative system (GC Europe NV, Leuven, Belgium) has been selected as restorative material and restorations were executed including the final application of the coating agent (Equia Coat). Frencken's success criteria have been used for clinical evaluation of restorations.

Results At the end of the enrolment for the study in November 2010, 304 dental restorations (202 patients, 82 class I, 150 class II, 72 class V) have been included in the study. In December 2022, at the end of the 12-years follow-up, 103 patients with 127 restorations have been re-evaluated. During 12 years, 77 restorations were registered as drop-out since patients didn't respect the follow-up planning or they were not available anymore. Of the remaining 227 restorations, 81 were recorded as failed: 45 due to non-repairable breakdown, 16 complete loss/detachment, 30 were found substituted by other practitioners (12 described as restoration breakdown, 18 due to aesthetical reasons). 19 were lost due to tooth extraction (periodontal problems: 11; tooth/root breakdown: 5; strategical choice: 3).

General Success Rate (GSR, Frencken's Code ≤ 3) and General Integrity Rate (GIR, only code=0) were respectively 47,6% and 32,2% at 144 months (Table 1). The failure rate was influenced by tooth position, number of involved walls, type of restoration. Class I, Class II and Class V restorations reported respectively 93,9 %, 48,0% and 44,4% of GSR at 12 years.

Conclusions A high-viscosity glassionomer cement coated with a specific light-cured resin confirmed to be a considerable alternative for permanent dental restorations, especially for single surface cavities on molars and premolars. More than 22% of registered failures occurred due to unaccepted aesthetical aspect, despite the clinical success of restorations.