The aim of this in vivo study is to report on the combined use of a fluorescence intraoral camera and transparent sealant for the clinical monitoring of pits and fissures. 96 permanent molars with a ICDAS II code 0, 1, or 2, (in 48 patients aged 12–14) were regis- tered at the First Observation Unit (Oral and Maxillofacial Sci- ences Department), Sapienza University, Rome. Clinically selected teeth were double-checked using a VistaCam iX Proof (Dürr Den- tal AG) and sealed with a transparent sealant (ControlSeal, VOCO GmbH), following the established indications for use if a pit and fissure condition was confirmed within the camera's internal cut- off point of 1.5 ("early enamel demineralization"). Clinical follow- up was performed using VistaCam at 6 and 12 months to assess sealant retention and any demineralization trend. At baseline, 57.4% of the registered teeth were sound, both visually and when using the fluorescence camera, 42.6% presented an early deminer- alization (<1.5 with VistaCam and ICDAS II 1- 2). Subsequent VistaCam assessment of surfaces underlying the transparent seal- ant totally confirmed initial evaluations. Complete sealant reten- tion rated 95% at 6 months, and 91% at 12 months. No case of complete detachment was observed. At the 12-month follow-up, VistaCam measurements resulted stable in the whole sample, ex- cept for one permanent molar, which presented a demineralization increment and partial sealant retention. Visual and fluores- cence assessments were consistent and feasible. Incomplete sealant retention occurred in 5% of cases at 6 months and 9% of cases at 12 months and was probably due to procedure imperfections. The combined use of transparent sealant and a fluorescence camera shows clinical effectiveness and diagnostic efficacy for occlusal surface monitoring. This project has been made possible in part by VOCO GmbH.