How can dentist make your teeth shiny?

Because of esthetic demand, light cured dental composites are getting popular in dental practice. The cost of dental composite resin is cheaper than all-ceramic material and is able to fill the tooth cavity immediately and maintain minimally invasive approach. However, inadequate polishing of composites can increase surface roughness and plaque accumulation. The rugged composite surface will cause tooth discoloration and unfavorable tactile impression of tongue. It favors secondary bacterial adhesion and biofilm redevelopment even though the plaque was removed from the cleaned composite surface. Consequently, it will increase the risk not only of recurrent caries but also of periodontal disease. Therefore, optimal surface polishing of a hybrid dental composite is important for the longevity of the restoration and for healthy adjacent oral tissues.

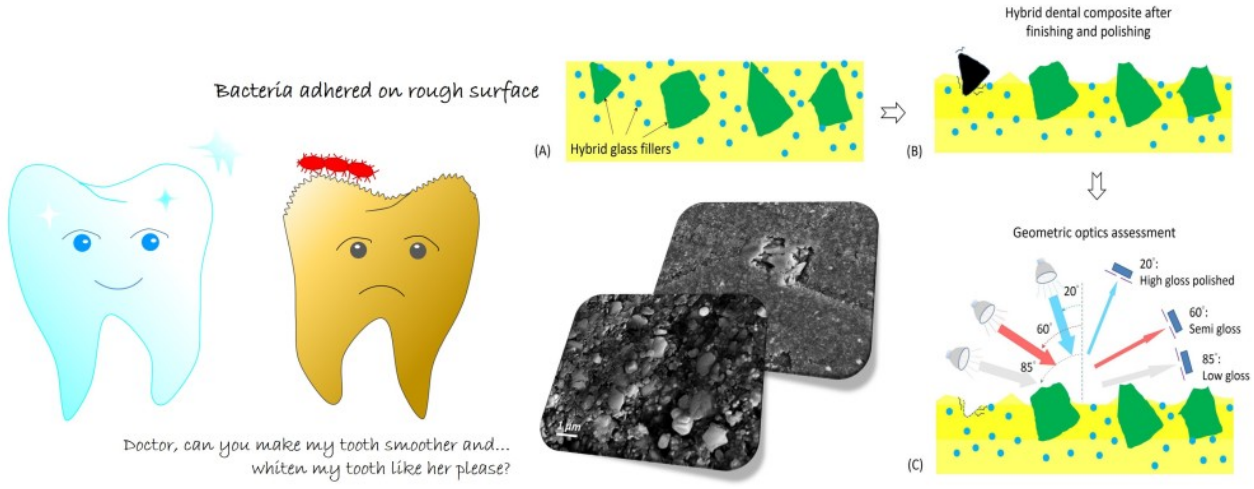

Fig. 1. Illustration of polished surface of hybrid dental composite

For light cured dental hybrid composites, reinforcing particles are much stiffer than the matrix, which makes it difficult to polish to a shiny surface. The aim of the study was to investigate the polishing mechanism via the geometric optics approach (Fig. 1). To define the polishing abilities of six instruments, we use the obtained gloss values through the geometric optics approach (using three illumination angles glossmeter, micro-Tri-gloss® with 20, 60, and 85 degree measurement angles).

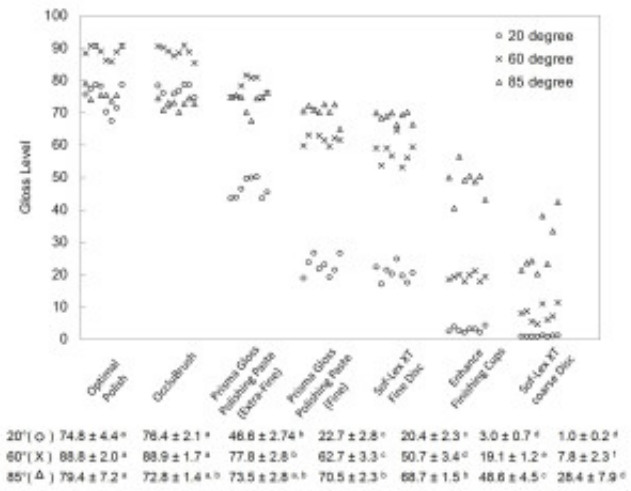

Fig. 2. Gloss levels of the hybrid composite surfaces polished with individual polishing instruments

The surface texture was validated by using a field emission scanning electron microscope (FE-SEM). Based on the gloss values, we sorted polishing tools into three abrasive levels, and proposed polishing sequences to test the hypothesis that similar abrasive levels would leave equivalent gloss levels on dental composites.

The study represented a clinically relevant minimum polishing sequence, independent of any company suggestions or interests. Results showed that the surface textures (FE-SEM micrographs) correlate well with the obtained gloss values. Nominally, similar abrasive abilities do not necessarily result in equivalent polish levels, indicating that the polishing tools must be evaluated and cannot be judged by their compositions or abrasive sizes (Fig. 2). The three-illumination-angle gloss meter has great potential to provide a quantifiable and nondestructive way to evaluate and optimize finishing and polishing sequences of different dental composites via various abrasive instruments.

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