Bristle end-rounding quality of ten commercial children’s toothbrushes


Aim
The aim of the study was to compare the end-rounding quality and smoothness of filament tips of 10 commercially available children's toothbrushes, since sharp, unpolished filaments may lead to injury of gingival tissue and cervical abrasion.

Trial conditions

Products under investigation
Ten children's toothbrushes including elmex® training toothbrush and aronal® eco-dent toothbrush for children.

Methodology
Scanning electron micrographs (45° viewing angle) were used to evaluate end-rounding and smoothness of filament tips. After technical processing, filament end-rounding was analyzed both visually and by shape factor (SF) analysis, whereas surface quality was analysed only visually (Silverstone & Featherstone 1988, Rawls et al. 1993). SF is based on the ratio of surface: circumference. Thus an optimal rounding can only be found in a circle (0.282).

Trial
120 randomly selected filaments per brand were examined in total (4 brushes x 5 tufts x 6 filaments). Quality of filament tips was analysed by a blinded single examiner.
Results

Results are summarised in Fig. 1, clearly demonstrating that SF and surface quality do not necessarily coincide. The highest mean SFs were measured for aronal® eco-dent toothbrush for children (0.278), followed by elmex® training toothbrush and a competitor's product (both 0.277). Together with another competitor's product, both aronal® eco-dent toothbrush for children and elmex® training toothbrush also showed the highest percentage of filaments with a smooth surface compared to the other products.

![Fig.1: Mean shape factors (SF) and percentage of filaments with smooth surface (SQ) calculated from 120 randomly selected filaments per brand.](image)

Conclusions

Only aronal® eco-dent toothbrush for children and the elmex® training toothbrush showed both highest SFs and acceptable surface quality, thus providing a reduced risk of injury of gums and cervical abrasion.