**Abstract:**

**Background:** Plaque is causative factor for gingivitis and periodontitis. Mechanical plaque removal is one of most commonly used method. Toothbrush has many modifications since decade. New bristles claim to remove more plaque and improve oral hygiene. The objective was to assess the effectiveness of three different bristle designed toothbrushes in terms of plaque removal and gingival inflammation.

**Methods:** A concurrent parallel randomized clinical trial was done among 105 female undergraduate medical students in which both examiner and analyser were blinded throughout the study period. The population was divided into three groups A, B and C (1:1:1) according to computer generated random list and assigned three different toothbrushes Oral B pro health (Crisscross), Oral B shiny clean toothbrush (Zigzag), Oral B sensitive care (Flat), respectively. Along with the toothbrushes, a fluoridated toothpaste was also provided. At baseline proper oral hygiene instruction and brushing method was demonstrated. Baseline plaque and gingival index score was assessed by using Silness J and Loe H (1964) and Loe H and Silness J (1963), respectively. The follow up data collections were done at 7,14 and 21 days. Friedman’s test was used to assess the association of plaque and gingival scores in different follow up. Pairwise PI and GI score were recorded and intergroup comparison of plaque and gingival scores were calculated by using Kruskal Wallis test.

**Result:** When compared to overall plaque and gingival score, there were significant reduction in every follow up (p<0.001). However, Zigzag tooth brush showed more reduction in plaque and gingival score; mean rank scores were 38.69 and 26.56, respectively but it was not statistically significant (p>0.05).

**Conclusion:** This study showed that the three different toothbrushes were equally effective in plaque removal and reduction of gingival inflammation. The Zigzag toothbrush showed maximum reduction in plaque and gingival inflammation; however, the difference was not significant.

**Clinical Trial registration:** The study was registered as a clinical trial by Nepal clinical Trial Registry (npctr.nhrc.gov.np) with reference no. REF/2021/04/000069 and trial no. NPCTR2021000016.

**Key words:** Bristle design, Gingivitis, Manual toothbrushes, Plaque