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Comparison of Mechanical Properties of Three Different Orthodontic Latex Elastic Bands Leached with NaOH Solution

Authors : Thipsupar Pureprasert, Niwat Anuwongnukroh, Surachai Dechkunakorn, Surapich Loykulanant, Chaveewan Kongkaew, Wassana Wichai

Abstract : Objective: Orthodontic elastic bands made from natural rubber continue to be commonly used due to their favorable characteristics. However, there are concerns associated cytotoxicity due to harmful components released during conventional vulcanization (sulfur-based method). With the co-operation of The National Metal and Materials Technology Center (MTEC) and Faculty of Dentistry Mahidol University, a method was introduced to reduce toxic components by leaching the orthodontic elastic bands with NaOH solution. Objectives: To evaluate the mechanical properties of Thai and commercial orthodontic elastic brands (Ormco and W&H) leached with NaOH solution. Material and methods: Three elastic brands (N =30, size ¼ inch, 4.5 oz.) were tested for mechanical properties in terms of initial extension force, residual force, force loss, breaking strength and maximum displacement using a Universal Testing Machine. Results : Force loss significantly decreased in Thai-LEACH and W&H-LEACH, whereas the values increased in Ormco-LEACH ($P < 0.05$). The data exhibited a significantly decrease in breaking strength with Thai-LEACH and Ormco-LEACH, whereas all 3 brands revealed a significantly decrease in maximum displacement with the leaching process ($P < 0.05$). Conclusion: Leaching with NaOH solution is a new method, which can remove toxic components from orthodontic latex elastic bands. However, this process can affect their mechanical properties. Leached elastic bands from Thai had comparable properties with Ormco and have potential to be developed as a promising product.

Keywords : leaching, orthodontic elastics, natural rubber latex, orthodontic
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