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The Effect of Thermoforming on Tear Strength of Ethylene Vinyl Acetate Mouthguard Material in Various Thicknesses

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Objective: To compare the tear strengths of non-processed and processed ethylene vinyl acetate (EVA) specimens in various thicknesses. Material and method: Two groups of EVA sheet (non-processed and processed) in three different thicknesses of 3, 4 and 5 mm were used in specimen fabrication. The processed EVA sheets were achieved by forming the EVA sheet on the cylindrical stone model with the pressure-molding device (Biostar®). Twelve of tear strength specimens of non-processed and processed group in each thickness were prepared following the ASTM D 624-00 guideline. The tear strength test was conducted using universal testing machine (Lloyd® 1K series) with the speed of 500 mm/min. The mean thickness and tear strength of the non-processed and processed specimens were compared using independent T-test. The differences in the mean tear strength for each thickness of non-processed and process specimens were determined using one-way ANOVA. Results: The mean tear strength of processed EVA specimens was significantly lower than the non-processed EVA specimens for every thickness ($P \leq 0.05$). There was no significant difference in the mean tear strength of EVA specimens among each thickness in both non-processed and processed groups. Conclusion: The mean tear strengths of processed EVA specimens (3, 4 and 5 mm thickness) were significantly lower than the non-processed specimens.