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INTRODUCTION

One of the disadvantages of elastics used in orthodontics is that the elasticity of force decreases over time, so it is important that the force of elastic is sufficient for the orthodontic movement of the tooth. However, little is known about the force degradation of the rubber and latex orthodontic elastics.

AIM

To determine the degradation of latex and non-latex orthodontic elastics force.

METHODS

Systematic review was conducted in compliance with PRISMA requirements. An electronic search with keywords: "orthodontic elastics", "force", "degradation", "loss", "decay", "*in vitro*", "strength" was performed up to February 10, 2022 in PubMed, Science Direct, Wiley Online Library, The Cochrane Library, Medline. The inclusion criteria were: full text, trials *in vitro*, written in English language, randomized controlled, prospective and retrospective studies published from 2012 to 2022, studies that assessed the force loss of rubber and latex orthodontic elastics. The articles were included with the consent of 2 authors, if opinions differed, the final decision was made by the third.

RESULTS

After initial search in electronic databases and applying selection criteria 265 articles were displayed, after duplicate removal 205 were left, after analyzing full-texts 9 articles were included in this review. All studies were performed *in vitro*. In all studies 2795 orthodontic elastics were included. Elastics were divided by material: latex [1-5,7-9] and non-latex [2-3,5-7]. Studies were performed in dry conditions [1-2,4,6,8], artificial saliva [1-4,6-7,9], distilled water [5,8]. Studies [4,9] including latex and studies [3,7] including non-latex elastics found the biggest loss of force after 12h ($p < 0,05$). Studies [1,3,7] including latex and studies [5-6] including non-latex elastics mention that the biggest loss of force was seen after 24h and later ($p < 0,05$). One study [5] found the biggest loss of latex elastics force after 1h ($p < 0,05$). Studies [1,3,5-7] found no statistically significant difference in force degradation in latex and non-latex elastics after 48h ($p > 0,05$). Studies [2,5,7] showed greater force loss in non-latex elastics in comparison to latex elastics ($p < 0,05$). One study [3] found greater force degradation in latex elastics when compared to non-latex elastics ($p < 0,05$). Studies [1,2,4] found that more significant changes in force decay were in wet environment ($p < 0,05$). The degradation rate of latex elastics with large diameter was slower than that of elastics with smaller diameters [3-5,9]. Smallest diameter-1/8"- recorded smallest force decay, the biggest force decay was in the - 5/16" [1].

CONCLUSIONS

The tensile force of latex and non-latex elastics decreases over time. Latex elastics have better mechanical performance than non-latex elastics. The force loss of the elastics was greater in wet than in dry environment. The larger diameter of the elastic the slower the force decayed.