

Evaluation of Gutta-Percha Points Standardization

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Abstract: For the obturation to occur satisfactorily, in addition to a well-conducted chemical-mechanical preparation, the obturator materials must be properly selected. Gutta-percha main points and accessories, associated with an endodontic cement, are the most commonly used materials to fill the root canals. The objective of this study was to evaluate the gutta-percha points standardization in Reciproc single cone obturation system, from VDW and Tanari brands, in apical diameter (D_0) of 25.08, 40.06 e 50.05($n=10$) sizes. The cones were stuck in a gutta-percha gauge and observed in an operating microscope in 40x increasing. Then, the diameter in the tip was measured with a digital caliper. It could be verified that there is no standardization of gutta-percha points AT D_0 in the tested brands.

Keywords: Endodontics. Pulp Cavity. Root canal obturation.

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I. Introduction

The root canal obturation is the finalization of a set of intracanal procedures and has as objective fill the root canal. For the obturation to occur satisfactorily, in addition to a well-conducted mechanical chemical preparation, the obturator materials must be properly selected. Gutta-percha main points and accessories, associated with an endodontic cement, are the most commonly used materials to fill the root canals.⁵ This root canals system sealing intends to eliminate the empty spaces which were occupied previously by the pulp, helping the repair tissue process.(CARVALHO et al., 2006) The sealing ability of endodontic cement does not prevent marginal infiltration due to their solubilization. Thus, the adaptation of gutta-percha points to the root canal may represent a decisive factor in the final sealing. The correct adaptation of the cone to the apical region depends fundamentally on the perfect coincidence of its apical diameter, with that of the instrument used to make the apical preparation.³ Although gutta-percha does not have adhesion to the dentin wall, it is extremely important to fill the canal due to its insolubility, but the good adaptation to the apical diameter is important so that the amount of endodontic cement is as little as possible.²

II. Material And Methods

This exploratory, sectional and comparative study used gutta-percha points Reciproc® (VDW Germany) and Tanari (Tanari Industrial Ltda, Brazil): size 25 and conicity .08, size 40 and conicity .06 and size 50 and conicity .05 The sample was 10 of each brand and size/conicity. Each cone was chosen randomly of different boxes, as sold in Market, and introduced into a larger caliber hole of a gutta-percha gauge Maillefer® (DentsplyMaillefer, Suíça) where 3 mm of cone tip passed through the hole and be free for diameter measurement in D_0 .

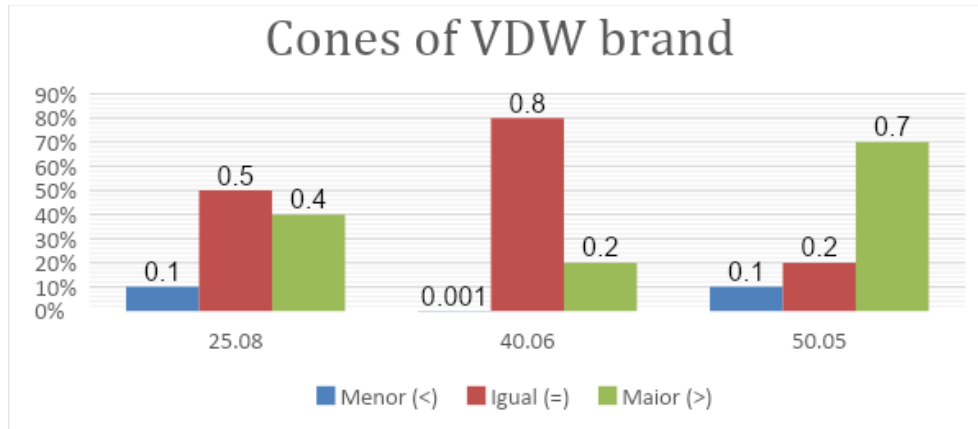
When the cone is stuck in the hole, the gutta-percha gauge was put above a cup, which supported the gutta-percha gauge. So, the cone tip was focused on the operating microscope (Alliance, Brazil) with a magnification of 400x, and with a calibrated digital caliper (Carbografite, Brazil), the D_0 diameter of each cone was measured. All measurements were checked three times and made by a single operator previously calibrated. All acquired measurements were tabulated and classified as correct or incorrect from the standard reference stipulated by the manufacturers (0.25 mm, 0.40 mm, 0.50 mm diameter tips).

The results were marked in a table which the subgroup 1 were the cones larger than the recommended caliber, the subgroup 2, were cones in the recommended size and the subgroup 3, cones smaller than the recommended

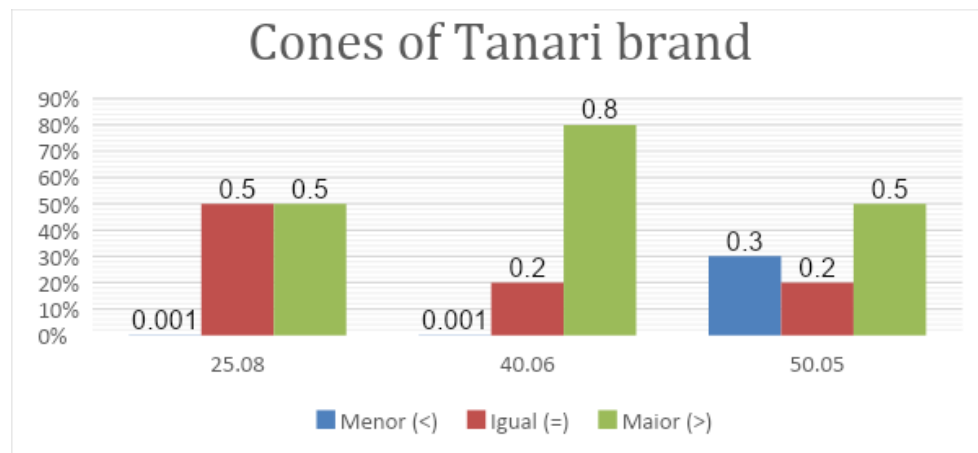
IBM SPSS (version 21) software was used for collecting data tabulation and to realize descriptive statistics (percent) of proportion, besides that distribution graphics were made from the analyzed and computed answers.

III. Result

The results of the measurements made with a digital caliper and electron microscope aid for the VDW and Tanari 25 conicity 08, 40 conicity 06 and 50 conicity 05 cones are shown in the following graphs. Among the 60 cones randomly examined, 6 were excluded from the sample because they had oval D_0 (2 cones 25.08, 3 cones 40.06 of the VDM brand, plus 1 cone 40.06 Tanari), with a total of 54 cones.



From the results in the graphic above, it's possible to observe that the VDW gutta-percha cones brand, specifically about the sizes 25.08, 10% from the total, the size showed size smaller than the recommended, 50% were equal and 40% bigger. Among the 40.06 measuring cones, none had a smaller size, most of them, represented by 80% of the cases, in fact, they were the same size as recommended and only 20% had a larger size. On the other hand, it was observed that the 50.05, 10% had a smaller measurement, 20% the same measure and the majority, this time represented by 70% of the cases, presented larger size than recommended.



About Tanari brand cones, we can verify that, as shown in the graphic above, none of the 25.08 measurement presented as smaller than the recommended, half of them had the expected size and the other half was bigger. Within the cones with 40.06 measurements, none was smaller, just 20% of them had the same sizes and the most part (80%) were bigger than the recommended. Ultimately, 30% of 50.05 cones were smaller, only 20% were equals and 50% of them presented larger sizes than the expected.

The search for faster endodontic treatment has led to the emergence of single instrument mechanized instrumentation and single gutta-percha cone obturation techniques. However, the treatment quality must be observed, including the apical sealing with perfect coincidence between the gutta-percha diameter D_0 and the apical stop.

However, the studies show that several cones didn't match the product data specifications. Most parts of cones were calibrated or very close to the pattern of diameter reference.² Ceribelli (2013) found significant numbers about D_0 diameter variation as stipulated in gutta-percha cones of Tanari brand [65% (>); 19% (<)].

Through the results of the present study and other studies^{3,5,10}, it was verified that standardized gutta-percha cones have, to a greater or lesser extent, variations from the specified diameter. In this study, the brand that presented the best result was Tanari (60%).

Within the 60 cones analyzed, 40% were within the stipulated pattern, 51.67% with larger measures and 8.33% with smaller measures. It was also observed that there were cones in those brands which had an oval shape, presenting two diameters, so they were discarded from the study.

The clinical commitment to treatment failure may be a consequence of this lack of standardization, as the gutta-percha cone diameters and conicities are expected to be accurate. The changes observed due to the complexity of the manufacture of gutta-percha can be justified; they may also undergo dimensional changes due to age, storage, and temperature at the time of measurement, or also due to measurement errors due to difficulties in calibrating the researcher or caliper.¹⁵

IV. Conclusion

Given the research results with the reported methods, there's no standardization in gutta-percha points in D₀ in the tested brands.

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