

Clinical uses of rectified turpentine oil

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Summary

Rectified turpentine oil can be used to soften or dissolve gutta-percha in the root canal space to facilitate endodontic retreatment or preparation of space for a post. For endodontic retreatment, the turpentine oil can be heated to 71°C which significantly increases its ability to dissolve gutta-percha. For removing only a portion of the gutta-percha while leaving the rest intact, as for the preparation of space for a post, the turpentine oil is delivered to the canal at body temperature (37°C).

Keywords: gutta-percha, rectified turpentine, turpentine

Introduction

Gutta-percha is the most widely used material to obturate the root canal space. Removal of gutta-percha is required when it is necessary to create space for a post or if root canal retreatment is indicated. Removal of well compacted gutta-percha is difficult. Well compacted gutta-percha offers resistance to penetration by files and may be difficult to distinguish from the surrounding dentinal walls. Attempting to remove well-compacted gutta-percha from the canal space may result in deflection of the file and perforation of the root canal wall.

Solvents can be delivered to the canal space to soften or dissolve gutta-percha, thus greatly facilitating removal. Softened gutta-percha is easily distinguished from dentine and easily removed. The most frequently used gutta-percha solvents in dentistry are chloroform (Stabholz *et al.* 1991) and xylene (Ingle *et al.* 1985). However, chloroform is carcinogenic (Lewis 1993) and xylene may also be, (Olsson and Brandt 1981, Matsushima *et al.* 1990), so their use in dentistry may be questionable.

Alternatives to chloroform and xylene have been recommended. Halothane (Hunter *et al.* 1991, Wilcox

1995) and rectified turpentine oil (Kaplowitz 1990) have demonstrated some efficacy in softening and dissolving gutta-percha but are not aggressive organic solvents.

Turpentine is one of the original solvents used in the commercial production of gutta-percha. At body temperature (37°C) it is a weak gutta-percha solvent. However, when heated to 71°C (160°F), its ability to dissolve gutta-percha is significantly increased. This paper describes two clinical techniques for using rectified turpentine to facilitate the removal of gutta-percha from the canal space. In the first technique, rectified turpentine oil is used to remove only a portion of the gutta-percha to make room for a post, while leaving the rest intact. In the second technique, rectified turpentine oil is used to facilitate the complete removal of gutta-percha to enable root canal retreatment.

Materials and method

Post space preparation

The goal of this technique is to soften only a portion of the gutta-percha in the canal and to expedite removal of just enough gutta-percha to create room for a dowel, while leaving the apical portion of the gutta-percha intact. This technique takes advantage of rectified turpentine oil being a weak gutta-percha solvent at body temperature.

After establishing access to the gutta-percha, rectified turpentine oil at room temperature is drawn up into a syringe and delivered to the coronal pulp chamber or canal space. A few minutes is allowed for the rectified turpentine oil to achieve body temperature (37°C). At body temperature, the rectified turpentine oil will soften only the most superficial (i.e. most coronal) few millimetres of gutta-percha. Using a long shank round bur or Gates-Glidden drill rotating at slow speed, softened gutta-percha is removed. The softened gutta-percha is easy to distinguish from the surrounding dentinal walls (Kaplowitz 1993). Since only a few millimetres of gutta-percha will be softened by each application of turpentine

oil at body temperature, the rest of the gutta-percha mass will remain intact. The procedure is repeated as required. This allows the clinician to remove only as much gutta-percha as necessary to create space for the post while leaving the apical portion of gutta-percha intact.

Root canal retreatment

The goal of this technique is to remove all the gutta-percha from the canal system to enable root canal retreatment (Kaplowitz 1994a). In order to accomplish this, the rectified turpentine oil should be heated to 71°C (160°F) (Kaplowitz 1994b). An electric heat source is used and the temperature monitored with a thermometer. The oil should not be heated over an open flame as turpentine is flammable. Adequate exhaust and ventilation are required to eliminate fumes generated by heating the turpentine.

The heated rectified turpentine oil is drawn up into a syringe and delivered to the coronal pulp chamber or canal space. At 71°C, the surrounding tissue will not be damaged (Hand *et al.* 1976). The rectified turpentine oil will soften and dissolve several millimetres of gutta-percha. After delivering the heated turpentine, the softened mass of gutta-percha is gradually penetrated with files and removed. The process is repeated as necessary until all the gutta-percha has been removed. If the clinician has been accustomed to using chloroform or xylene in endodontic retreatment, it will be found that more time and effort is required when using heated rectified turpentine oil.

One advantage to using heated turpentine oil is that the dissolution capability can be controlled by varying the temperature of the turpentine oil. In the coronal and middle portions of the root canal space, gutta-percha can be softened and dissolved with the turpentine oil heated to 71°C. This will expedite removal. However, in the apical third, the clinician may wish to just soften the gutta-percha without completely dissolving it to decrease the chance of expressing dissolved gutta-percha or solvent into the periapical tissue. This can be accomplished by using turpentine oil at or just above body temperature. The salient point here is that the clinician is not bound by one dissolution constant but can manipulate the ability of turpentine oil to soften or dissolve gutta-percha to better meet clinical needs.

Discussion

Rectified turpentine oil can be used to achieve two different clinical goals. Either it can be used to remove only a portion or all the gutta-percha. In this regard, rectified turpentine oil offers an advantage over the other solvents since its ability to soften or dissolve gutta-percha can be controlled by regulating its temperature.

None of the gutta-percha solvents available today satisfy all the needs of the clinician. All the gutta-percha solvents available are either toxic or carcinogenic and all produce an inflammatory response in the periradicular tissue (Barbosa *et al.* 1994). Chemically, some solvents are more aggressive than others and some are easier to use than others. It is up to clinicians to balance efficacy and safety and to select the solvent that is most suitable for their needs.

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