

Decoding of disinfection regime used in revascularization

Sir,

Nowadays several cases of revascularization carried out in immature teeth irrespective of age and periapical status are published.^[1] However, it is of paramount significance to emphasize on proper disinfection protocol for its successful outcome. Initially, disinfectants used in revascularization were aimed to provide maximum disinfection without seeing its adverse effects on stem cells. However, contemporary disinfection protocol considers various factors like the effect of irrigants and intra-canal medicaments on the release of growth factors from dentin, the interplay between the undifferentiated mesenchymal stem cells and disinfectant, etc. From a biological point of view, although normal saline is the best irrigant to be used in teeth with open apices, it should never be used alone because of its poor antibacterial properties and inability to remove the smear layer. In revascularization, sodium hypochlorite (NaOCl) is widely used at higher concentrations (around 5-6%). However, its higher concentration has direct and indirect detrimental effect on survival, attachment and differentiation stem cells, which would persist long after the irrigant had been removed.^[2] In addition, such a high concentration has a detrimental effect on dentin elasticity and flexural strength of thin radicular walls. Hence, lower concentration of NaOCl (1.5%) is to be used. Ethylenediaminetetraacetic acid (EDTA-17%) should be used in revascularization because it increases the bioavailability of dentin-derived growth factors embedded into dentin that help in proliferation, survival, and differentiation of dental stem cells.^[3] Importantly, use of EDTA after NaOCl attenuates its undesirable effects.^[4] Despite satisfactory antimicrobial properties chlorhexidine (concentrations of 0.12-2%) limits the survival and adherence of stem cells to dentinal walls. Newer irrigants such as Aquatine EC, Q-mix, tetraclean, mixture of a tetracycline isomer, an acetic acid, and tween 80 detergent and herbal irrigants such as Morinda Citrifolia™, Triphala, green tea polyphenols, Arctium lappa, propolis, etc. need to be evaluated further to see its effect on stem cells to use it in revascularization routinely.

Use of various intra-canal medicaments such as calcium hydroxide and triple antibiotic paste (TAP) are recommended to ensure thorough disinfection in

revascularization. Literature search reveals both destructive as well as inductive properties of calcium hydroxide. It can solubilize bioactive molecules, including growth factors of human dentin matrix that would stimulate mesenchymal pulp cells to differentiate into odontoblast-like cells.^[5] However, another study showed that calcium hydroxide could damage the epithelial cell rests of Malassez that is important structure for multipotent stem cell proliferation.^[6] Furthermore, TAP when in contact with the stem cells of apical papilla for a prolonged period could decrease the number of viable stem cells and stem cells delivered into the root canal system after the evoked bleeding step in revascularization. Hence, calcium hydroxide and TAP insertion should limit to the cervical third of the root canal. Moreover, photo-activated disinfection is a new, selective antimicrobial strategy that can be used successfully in revascularization.^[7]

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Conflicts of interest

There are no conflicts of interest.

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