Selective and stepwise carious tissue removal in primary molars

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BACKGROUND

The treatment of deep carious lesions risks exposing and injuring the pulp, as well as postoperative pulp complications that can require removal of the restoration. Three major treatment options are used: nonselective carious tissue removal, which removes all bacterially contaminated and demineralized dentin in the cavity; stepwise (SW) carious tissue removal, which is a 2-step process that removes carious tissue in the cavity's periphery but leaves leathery or soft dentin in the pulp area, sealing it with an interim restoration, then re-entering at a later point to remove carious tissue until firm dentin remains over the pulp; and selective (SE) carious tissue removal, which proceeds only through the first step of SW, leaving hard dentin in the periphery and leathery or soft dentin near the pulp. The risk of exposing the pulp is most likely with nonselective carious tissue removal. Dentists should therefore limit their choices to SW or SE. A single study has compared them and found no significant difference in risk of pulp exposures or pulp complications. A pilot study was undertaken to compare the 2 methods in terms of their success and survival, initial and follow-up treatment costs, and the levels of satisfaction of the patients, practitioners, and parents.

METHODS

Seventy-four patients (36 girls and 38 boys) age 3 to 9 years (mean 6.3 years) were included. For each, a single molar with a deep carious lesion was selected, with 1 group receiving treatment with SW and the other with SE. The patients were re-examined after 6 months. The molars treated by SW were re-entered, the remaining tissues were removed until only firm dentin was present, and the restoration was replaced. All molars were the re-examined after another 6 months. The measures sought were success of the restoration, which was defined as having no complications that required repeat interventions; total treatment and opportunity costs, with the latter covering the costs generated by the parent bringing the child to and attending the dental appointment instead of working; and the subjective assessments of the patients, dentists, and parents.

RESULTS

One patient dropped out at 12 months, but no significant differences in baseline characteristics were seen between the SW and SE groups. Pulp exposure occurred in 2 molars (5.4%) at the second step in SW therapy but in none of the SE-treated molars. Pulp exposures were managed with pulpotomy and stainless steel crowns. One tooth in the SE group was extracted 6 months after treatment because of pulp inflammation and abscess formation. The adjacent permanent molar received a customized space maintainer.

The patients, parents, and dentists rated the 2 treatments similarly. However, SW was associated with significantly higher initial and total treatment costs as well as opportunity costs compared to the SE treatment costs.

Regression analysis revealed that the success and survival rates were similar for the 2 groups. The initial treatment costs decreased significantly with increasing cooperation. However, SW significantly increased treatment and opportunity costs both for initial and follow-up treatments. Neither treatment allocation nor covariates had a significant effect on patients' subjective evaluations.

DISCUSSION

Pulpal and restorative complications are not uncommon during the treatment of deep lesions in primary teeth. Although SW is widely accepted and applied in these cases, the second treatment step is associated with a higher risk for pulpal exposure and injury as well as higher costs for treatment compared to SE approaches. No significant advantage has been found to be associated with the second step compared to treatment according to SE protocol. Although the success rates with the 2 treatments are comparable, the higher costs with SW make SE a more attractive option.

Clinical Significance

Based on the short-term results in this trial, SW and SE produce comparable success rates and elicit similar levels of satisfaction from patients, dentists, and parents. This was a pilot study with a limited sample size and number of events. Therefore, its results must be interpreted with caution. However, it appears that SW is associated with significantly higher costs when compared to SE, and this is a factor that can have a major impact on parents and payers. Dentists should include this information when evaluating the best way to manage deep carious lesions in primary molars.

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