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JACK L. BRAUER DDS

BEN HILTON DDS

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Caries Arresting Approaches for Aging and Medically Complex Patients

Jane Gillette, DDS

ABSTRACT Due to conditions such as infirmity, cognitive decline or xerostomia, older adults frequently experience increased dental disease. Those with advanced frailty or cognitive impairment and dental caries present special challenges for dentists, as comprehensive dental care can be invasive, intensely stressful and sometimes futile in the last years of life. Progressive approaches that use chemotherapeutics, such as silver diamine fluoride, can successfully be utilized to nonsurgically manage dental caries in aging or medically complex patients.

AUTHOR

Jane Gillette, DDS, provides nursing home care in Montana, is a media spokesperson for the ADA on evidence-based dentistry and is the recipient of the 2015 ADA/American Association of Dental Research Evidence-Based Practice Award.

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With improvements in access to fluorides, oral hygiene products and healthy foods, older adults in the U.S. are not only living longer, but retaining their teeth longer as well.[1–3]

There have also been gains in untreated disease rates, although still roughly 20 percent of adults aged 75 and older have untreated dental caries.[3] This prevalence is arguably higher for low-income adults residing in long-term care facilities, as dental disease rates are higher in low-income populations[4] and patients residing in long-term care facilities experience greatly restricted access to oral health care services.[5] A 2011 study conducted in a skilled nursing facility in Minnesota describes this critical issue well.[6] The study found that depending on cognitive status, 82 to 92 percent of patients entering the nursing home had one or more carious teeth or root retained tips and that those with impaired cognition or dementia suffered disproportionally more.

For older adults, tooth loss can be a serious issue as the presence of teeth can have a substantial impact on socialization, chewing, maintaining adequate weight and nutrition. The consequences of malnutrition in the frail elderly are great, including increased infections, poor wound healing and pressure sores. For those with advanced dementia or Alzheimer's disease, even with the presence of teeth, mealtime can be challenging, as they frequently lose interest in eating, forget how to use utensils and even experience impairments in swallowing.[7]

Caring for the elderly in the last years of life presents special challenges for dentists, particularity for those who are caring for patients who are frail or with brain failure (dementia or Alzheimer's). Foremost, patients with these conditions have a disease trajectory of prolonged dwindling resulting in a slow decline from an already low level of baseline functioning and ultimately to death. However, the time to death is quite variable and may take six to eight years.[8] It is this variability

FIGURE 1. Jason Tanguay, DDS, assisted in a nursing home by University of Utah first-year dental student Derik Powell. (Photo courtesy of Sydney Judd)

FIGURE 2A. Second SDF application appointment: before toothbrushing and application of SDF.

FIGURE 2B. Second SDF application appointment: after toothbrushing and application of SDF.

in time to death that makes treatment decisions regarding usual comprehensive dental care versus palliative dental care difficult. The findings of a study that examined dental treatment intensity in the last years of life is revealing in this regard. The study found that most people receive no dental services, but of those who did, a significant number received full comprehensive dental care in their last three months of life.[5] In addition to being both physically and emotionally stressful for frail elders, this type of care in the last months of life is futile.[9]

Even if dentists could reliably predict the time to death, the time-course of oral conditions (such as dental caries) has its own set of prediction difficulties. Caries is a multifactorial time-dependent disease. Accordingly, carious lesions can remain at a particular stage[10] for months, if not years, or they may progress quickly to an acute phase. The time at which a carious lesion will become an acute dental condition is unknown. It is only known that it *may* sometime in the future become acute. This leaves the dentist with two nearly unanswerable questions which ultimately drive the decision of providing comprehensive dental care versus palliative dental care: When will my patient die and when, if ever, will this caries-affected tooth become an acute dental condition? These are deeply significant issues for dentists to address, because the worst outcome would be for the patient to develop an acute dental condition while at their most vulnerable stage of life.

The second factor that dramatically impacts a dentist's decision in providing comprehensive dental care versus palliative dental care is a patient's level of physical and cognitive functioning. A thorough medical history and physical exam can inform a dentist as to the intensity of treatment a patient can safely endure and any needed modifications to care. With respect to cognitive impairment, such as those with advanced dementia or Alzheimer's, Niessen et al. developed a decision support tool dentists can use to assess a patient's ability to cope through dental treatment and to guide the process of deciding appropriate treatment intensity and ongoing care.[11] This decision support tool advises intensive prevention at all levels of cogitative impairment, but also advises that patients with mild impairment should be restored quickly to function and patients with advanced brain disease should receive conservative maintenance of the dentition and emergent care.

While the paradigm shift toward treating dental caries as a chronic disease through a medical management approach is not new,[12] dentistry has had a renewed interest in the topic with the relatively recent introduction of Food and Drug Administration-approved silver diamine fluoride (SDF). Silver diamine fluoride, along with other chemotherapeutics, is a valuable treatment option for those caring for aging patients. These nonsurgical approaches for managing dental caries are low-cost, have minimal adverse effects and are easily applied. Silver diamine fluoride when used alone or in combination can arrest or significantly slow down the caries disease process.

The impact of this rapid halting of the disease is that the unpredictable nature of time to death is no longer an issue. It removes the concern that the patient will endure expensive, stressful and futile surgical care in their last months of life. If the patient's disease trajectory is such that they reach death in five years, the nonsurgical therapy of SDF will have been low-cost and easy for the patient to receive and will have avoided the progression of caries to an acute condition. For a patient with a shorter disease trajectory, if death occurs in the near future, the nonsurgical therapy of SDF will have again been low-cost and easy for the patient to receive and will have avoided the progression of caries to an acute condition in their last, frailest months of life.

Chemotherapeutics for Preventing and Arresting Dental Caries in Older Adults

SDF, alone or in combination with other chemotherapeutics, can successfully treat and prevent dental caries in aging populations. A study evaluating the effects of SDF in arresting root caries in community-dwelling adults found that SDF alone arrested root caries at a rate of 90 percent.[13] Arguably, those residing in long-term care facilities require special considerations due to their complex medical conditions, severely limited access to routine dental care and insufficient facility-provided daily mouth care.[14] Accordingly, dentists

FIGURE 3A. Third SDF application visit: before toothbrushing and application of SDF.

FIGURE 3B. Third SDF application visit: after toothbrushing and application of SDF.

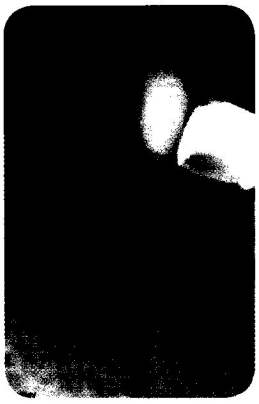

FIGURE 3C. Radiograph of tooth No. 25 shows periapical pathology.

caring for this population additionally use complementary chemotherapeutics such as fluoride varnish, high-dose daily fluoride mouth rinse, chlorhexidine varnish and even povidone-iodine.

For decades, topical fluoride has been the primary approach for preventing and arresting caries. Evidence suggests that three applications per year of 22,500 ppm sodium fluoride varnish may reduce caries in older adults.[15] Daily 0.2% neutral sodium fluoride mouth rinse may have benefits as well, both in terms of preventing and arresting caries. A study conducted in institutionalized adults that compared daily high-dose fluoride mouth rinse to chlorhexidine and placebo reported a 24 percent decrease in new caries and that caries was arrested at a rate of 59 percent.[16] While chlorhexidine mouth rinse in this study was found to *increase* caries, other evidence suggests that a 1:1 mixture of chlorhexidine/thymol varnish may be effective for managing root caries.[17] Povidone-iodine is another agent that is easy and inexpensive and, if applied at two-month intervals, may have some benefit as well,[18,19] although studies that have evaluated this approach have been conducted mainly in children. Lastly, though not a caries preventing or arresting agent, pilocarpine lollipops (5 g pilocarpine/2 g xylitol), which help increase saliva production in patients with xerostomia, have been gaining in popularity. In this technique, patients suck on the lollipop for 15 seconds any time they have the sensation of mouth dryness and/or before meals.

Clinical Technique for Arresting Caries in Older Adults

Federal law requires that skilled nursing facilities ensure that a dentist is available for residents, either by employing a staff dentist or by having a contract with a dentist to provide care. Facilities are additionally required by federal law to ensure residents have access to both 24-hour emergency services and routine dental care (i.e., diagnosis of dental disease, restorations, minor denture care).[20] Accordingly, dentists are frequently part of a skilled nursing facility's care team (**FIGURE 1**). The following two cases highlight treatment approaches commonly used by dentists caring for patients in skilled nursing facilities.

Case Presentation One

Palliative care using a caries arrest technique (**FIGURES 2A** and **2B**): Patient is a widowed American Indian who is an 88-year-old female with moderate dental anxiety and has lived in a nursing home for four years. She was diagnosed with advanced dementia, hypertension, hypothyroidism and chronic obstructive pulmonary disease. The patient is being treated with nine medications for her medical conditions, which is resulting in xerostomia. She has restricted mobility, especially in her neck. The maxillary arch is completely edentulous and the remaining teeth on the mandible, Nos. 22, 27, 28 and 29, are carious but not pulpally involved. She has a maxillary denture but does not wear it.

Treatment goals: To provide minimally stressful or invasive care by the delivery of caries arresting chemotherapeutics.

Treatment:

- Apply 38% SDF at three-month intervals.
  Remove debris with toothbrush
  Isolate area with cotton rolls and dry tooth surface with gauze.
  Dispense one drop of 38% SDF into dappen dish and wet microtip brush.
  Apply SDF to affected tooth surface for 30 to 60 seconds.
  Blot dry and apply 5% NaF sodium fluoride varnish.
- Apply 5% NaF sodium fluoride varnish at three-month intervals.
  Dry teeth and apply fluoride varnish to all surfaces of teeth.

Prescriptions:

- Fluoride dental rinse 0.2%
  Disp: 16-ounce bottle
  Sig: Nursing staff to brush and swab off of teeth one teaspoon once upon waking, once before bed and after staff-assisted toothbrushing. If possible, avoid eating or drinking for 30 minutes after use.
- 5 g pilocarpine/2 g xylitol lollipop
  Disp: One lollipop
  Sig: Suck on lollipop 15 seconds before each meal.

Case Presentation Two

Palliative care using a caries arrest technique and active disease monitoring (**FIGURES 3A–3C**): Patient is a widowed Caucasian 91-year-old female who has

lived in a nursing home for two years. She has a history of stroke and was diagnosed with a urinary tract infection, hypertension, complete blindness and no use of her right dominant hand. The family and nursing home are discussing beginning "comfort care" (withholding futile curative therapies and relieving suffering during the dying process). The patient is being treated with 12 medications for her medical conditions, which is resulting in xerostomia. The maxillary arch is completely edentulous. The remaining teeth on the mandible are Nos. 22–27 and 22, 23 and 25 are carious. Tooth No. 25 is pulpally involved, but without acute signs or symptoms. She has a maxillary full denture and a mandibular partial denture, which she wears.

Treatment goals: To provide minimally stressful or invasive care by the delivery of caries arresting chemotherapeutics and avoid surgical extraction of tooth No. 25.

Treatment:

- Apply 38% SDF at three-month intervals.
  Remove debris with toothbrush.
  Isolate area with cotton rolls and dry tooth surface with gauze.
  Dispense one drop of 38% SDF into dappen dish and wet microtip brush.
  Apply SDF to affected tooth surface for 30 to 60 seconds.
  Blot dry and apply 5% NaF sodium fluoride varnish.
- Apply 5% NaF sodium fluoride varnish at three-month intervals.
  Dry teeth and apply fluoride varnish to all surfaces of teeth.
- Active disease monitoring of tooth No. 25.*
  Nursing staff to assess daily for changes in clinical signs or symptoms.
  Dentist to provide limited exam including radiographs at three-month intervals to monitor disease state.
  Extract tooth No. 25 if it develops into an acute condition.

Prescriptions

- Fluoride dental rinse 0.2%
  Disp: 16-ounce bottle
  Sig: Nursing staff to brush and swab off of teeth two teaspoons once upon waking and once before bed after staff-assisted toothbrushing. If possible, avoid eating or drinking for 30 minutes after use.
- 5 g pilocarpine/2 g xylitol lollipop
  Disp: One lollipop
  Sig: Suck on lollipop 15 seconds before each meal.

Conclusion

As the U.S. population rapidly ages, dentists are faced with the increased need to conservatively manage dental caries in their frail elderly patients. Variabilities in time to death and the progression of caries to an acute condition make care planning challenging in this population. Progressive techniques for medically managing the disease of dental caries now makes it possible for dentists to conservatively care for patients, even in their most vulnerable stage of life. Silver diamine fluoride, one of the newest available chemotherapeutics in the U.S., can arrest or greatly slow disease progression. This approach can be used as an alternative to surgical care, which can be invasive and stressful for the elderly. Other more traditional modalities that can be used as well include fluoride varnish, daily high-dose fluoride mouth rinse, chlorhexidine-thymol varnish, povidone-iodine and pilocarpine. Avoiding surgical care in the elderly can enhance quality of life, health and happiness in the last stages of life. ■

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THE AUTHOR Jane Gillette, DDS, can be reached at drgillette@sproutoralhealth.org.

*Active disease monitoring is the purposeful, careful and patient/caregiver-informed monitoring of a significant dental condition that could become acute. It requires an education and monitoring plan for the nursing staff, regular nurse-assisted monitoring of the dental condition, regular dentist-nursing staff communication and informed consent of the patient or power of attorney.

FIGURE 3. Silver diamine fluoride was used to arrest primary and secondary root caries in this older adult. The balding of the tongue and caries resulted from xerostomia. The black, discolored surfaces do not show when speaking or smiling.
COURTESY STEVE DUFFIN, DDS

USE IN OLDER ADULTS

Six large randomized clinical trials demonstrated better caries prevention with SDF than any other noninvasive material except sealants, and nine demonstrated better caries arrest than any other noninvasive material (three studies overlap in evaluating both prevention and arrest).[13] This material's performance in arresting caries was similar to atraumatic restorative treatment.[13–15] When applied every six months, SDF arrests 91% of lesions within two years,[14,16] and no significant benefit is found with excavation of caries prior to placement.[17] Research shows that annual placement of SDF prevents more root caries in older adults than fluoride varnish or chlorhexidine varnish applied four times per year.[10] In addition, more frequent placement appears to be safe and even more effective.[14,18]

Annual application was shown to provide high preventive effects in two studies of older adults, although another study did not support these results. A recent paper showed preventive rates of 90% after 30 months,[19] while an earlier study showed a 71% preventive rate at three years.[10] A third study, however, reported a preventive rate of 25% after two years.[9] Additional research is needed in this area.

Repeated application, at least annually, appears to be critical to prevention and arrest. A dose-dependent improvement in effectiveness is seen with more frequent application[15,18] and higher concentration.[18,20] A case series with three applications over two weeks showed success in arresting caries, thereby eliminating the need for general anesthesia for an entire large community clinic.[21] The pattern of a dose-dependent response suggests more frequent applications, depending on caries risk. Similar to a double-strength "loading dose" prescribed at the beginning of antibiotic regimens for difficult infections (e.g., diffuse cellulitis), with severe caries lesions, it is logical to "load" the lesions more frequently at the beginning of treatment. A recent clinical trial of SDF in preschoolers verified a more rapid response from a loading-dose approach.[22]

One of the greatest challenges that caries arrest poses is to continue monitoring lesions over years without jumping to operative treatment. The evidence supports patience. Studies show that with semiannual application, 44% of caries are arrested after six months, 61% after 12 months, 81% after 18 months, and by 24 months 91% of lesions are arrested.[14,18] Because some lesions keep

growing, however, monitoring progress is critical. It may be best to cover some lesions with a restorative material, such as glass ionomer cement, at a subsequent visit.

SIDEBAR: PROCEDURE BILLING CODE

The Code on Dental Procedures and Nomenclature Code Maintenance Commission has approved Code 1354 for "interim caries arresting medication application." The code definition is for "conservative treatment of an active, nonsymptomatic carious lesion by topical application of a caries arresting or inhibiting medicament and without mechanical removal of sound tooth structure." This is the Health Insurance Portability and Accountability Act standard code for billing purposes.

METHOD OF ACTION AND INDICATIONS FOR OLDER ADULTS

Upon application of SDF to a decayed surface, silver reacts with bacteria and dentin collagen[23,24] to create a sclerotic silver-protein layer that is resistant to degradation.[25] Hydroxyapatite and fluoroapatite form, along with metallic silver.[26] The darkened, treated lesion hardens over a few weeks, while the lesion depth decreases.[26,27] The silver inhibits bacterial enzymes that break down the organic dentin matrix.[25,26,28] All caries-causing bacteria are susceptible to the effects of the silver ion.[24,29,30] The silver stays latent in the lesion, so it is available to kill reinvading bacteria.[31] Numerous clinicians have reported less plaque near treated teeth, and this has been reproduced in the laboratory.[32,33] More silver and fluoride soaks into carious or demineralized than sound dentin; as a result, treated demineralized dentin is more resistant to caries bacteria.[34]

Among this patient population, the primary indications for topical treatment with SDF are:

Disease control for lesions in high-caries-risk patients at the diagnostic visit, regardless of the restorative plan
Difficult-to-treat caries lesions, such as furcations and crown margins
Prevention for vulnerable surfaces — for example, gingival margins of compromised restorations, roots exposed from recession, and over-denture or partial denture abutments
Patients with extreme caries risk (e.g., individuals experiencing xerostomia from cancer treatment or using hyposalivatory medications)
Individuals who cannot cooperate because of Alzheimer's disease or other forms of dementia, Parkinson's disease, and other neuropsychiatric challenges
Patients living in nursing homes and other residential facilities with limitations on mobility and/or ability to seek care
Individuals without insurance benefits and/or living on fixed incomes

In these patients, SDF can be an effective first-stage treatment, and a component of long-term treatment (by continuing application twice per year, or more frequently, as indicated). This may be especially true with older adults who have physical or cognitive limitations that impede oral hygiene, or whose limited mobility poses challenges to oral health.

CLINICAL APPLICATION GUIDELINES

Recently, a team at the University of California, San Francisco School of Dentistry formalized best practices for SDF based on evidence and clinical experience. According to these clinical guidelines,[13] when a clinician determines that an older adult would benefit from treatment, and without removing restorations or carious dentin, the lesion(s) are gently rinsed, isolated with cotton rolls, air dried, and a fraction of a drop of SDF is applied with a microsponge. Dryness of the surface and frequency of reapplication are thought to have the most significant impacts on efficacy. Whether in a distinct cavitated lesion or at the margin of a compromised restoration, the reaction between the material and lesion is protected from saliva for one to three minutes. There may be temporary staining of the gingiva, which resolves over a few days.

Anecdotally, there have been reports of clinicians achieving even better results by covering the treated lesion immediately with a varnish or petroleum jelly without a rinse. As a fluoride product, most states allow placement by dental auxiliaries, facilitating reapplication at recall or in situations in which clinicians are working independently in residential facilities.

Lesions change color within a week as they arrest, and eventually look similar to naturally arrested caries lesions. Upon application, patients will note a metallic taste, which resolves without intervention. Treated lesions harden to gentle probing over the course of a few weeks.

SAFETY CONSIDERATIONS

Cleared for marketing in the U.S. in 2014 and made available the next year, SDF's regulatory parameters parallel that of fluoride varnish, as both are cleared for treating hypersensitivity, but are commonly applied in off-label use for caries management. After approval of SDF in Japan more than 45 years ago, no adverse events have been reported.35 Silver allergy — often confused with nickel allergy — is the only contraindication, but it is rare. Adults can tolerate considerable silver consumption chronically. With reasonable caution to use sparing amounts, this acute fluoride exposure does not present a safety concern.[36,37]

The relatively high concentration of ammonia appears to be the primary safety consideration. Using microliter volumes that are absorbed mainly into lesions, the cautious clinician will do no harm. If there is a breakdown of the protective barrier formed by gingiva or mucosa, the area should be protected with a thin layer of petroleum jelly. Universal precautions should be followed when using SDF. Topical application to the oral mucosa or skin can leave a temporary tattoo that will disappear without treatment in approximately two weeks.

In addition to darkening caries lesions, SDF can stain countertops and floors, although ammonia-based commercial cleaning agents or simply salt with a little water have been seen to remove stains not cleared by standard clinical disinfectants.

CONCLUSION

Newly available to U.S. clinicians, SDF is an evidence-based technology that offers an effective approach to caring for older adults. Indications include treating caries and recurrent decay, particularly in hard-to-access areas, such as furcations. Its indications as a preventive agent are based on high caries risk, and risk of caries due to the complexities of other therapies.

Cognitive disabilities (such as Alzheimer's disease), physical disabilities (such as Parkinson's disease or multiple sclerosis), and situational challenges (such as a lack of mobility or residing in long-term care facilities) often limit older adults' access to traditional dentistry. The use of SDF provides an alternative treatment modality that is consistent with the principles of caries balance. In addition, it does not interfere with other professional or self-care activities needed to restore and maintain caries control. Adding SDF to the armamentarium makes caries arrest practically feasible and enables extension of care to vulnerable populations.

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With Careful Case Selection, **SDF** Is Our **Preventive Ace in the Hole**

Much of dentistry has historically been focused on the surgical repair of the end stages of caries, a chronic disease for which there is no cure. The future of dentistry, however, represents a paradigm shift to the medical management of caries, focusing on its prevention and early interventions. Strategies include the application of topical antimicrobials and remineralizing agents—and silver diamine fluoride (SDF), a relatively "new" kid on the block (at least in the United States; it's been commercially available in Japan since 1970).

SDF is a game changer. Because it is inexpensive and easy to apply, it has the potential to expand access to care to our most vulnerable populations—young children, individuals with special needs, medically compromised patients, and the frail elderly—who may otherwise not be able to receive or tolerate traditional, surgical dentistry.

That said, SDF is not holy water, nor is it a magic bullet. Teeth with irreversible pulpitis, for example, are not candidates for SDF. And although some adults may decline the treatment in the esthetic zone, others—such as parents who wish to avoid sedation for their young children—appreciate the option. While SDF is a welcome addition to our dental toolkit, it needs careful case selection, thorough informed consent, and close follow-up and reapplication, as part of a comprehensive patient care plan. SDF does not restore form or function, so cavitated lesions that will continue to trap food and present a challenge to adequate biofilm removal would still benefit from a restoration.

The application of SDF is relatively quick, simple, and painless, offering the opportunity to build trust in even the most fearful child. Further, SDF is such a powerful desensitizer, in some cases it can eliminate the need for local anesthetic and sedation, and may be combined with glass ionomer restoratives and stainless steel crowns—also known as silver modified atraumatic restorative treatment (SMART)—using the Hall Technique. Thanks to SDF and minimally invasive treatment options, I have been able to reduce the use of sedation in my practice by 67% since 2014.

I CANNOT IMAGINE PRACTICING WITHOUT IT, AND I AM EXCITED FOR THOSE CLINICIANS WHO ARE JUST STARTING TO USE IT.

SDF is not just for pediatrics. It is very effective for caries management on difficult-to-treat surfaces, such as root caries in elderly patients. SDF also can be used at crown and filling margins to help extend the life of restorations. And it is incredible for hypersensitivity caused by conditions such as gingival recession, erosion, abfraction, and even molar incisor hypomineralization.

With a CDT code (D1354), increasing public awareness, and insurance reimbursement, along with an AAPD Policy Statement and an ADA Evidence-Based Clinical Practice Guideline on nonrestorative treatments for carious lesions, SDF is here to stay. I cannot imagine practicing without it, and I am excited for those clinicians who are just starting to use it.

With a private practice in Glendale, AZ, **Jeanette MacLean, DDS,** is a Diplomate of the American Board of Pediatric Dentistry and a Fellow of the American Academy of Pediatric Dentistry. She received her dental degree from the University of Southern California and completed her specialty training in pediatric dentistry at Sunrise Children's Hospital through the University of Nevada School of Medicine. She was featured in a July 2016 *New York Times* article, "A Cavity Fighting Liquid Helps Kids Avoid Dentists' Drills," which brought national attention to the option of treating cavities noninvasively with SDF.

ADA American Dental Association®

211 East Chicago Avenue
Chicago, Illinois 60611

T 312.440.2500
F 312.440.7494
www.ada.org

State Medicaid Fee Schedules – D1354

	Description	Fee Paid-State posted Fee Sch
Arizona	INTERIM CARIES ARRESTING MEDICAMENT APPLICATION	Manual Price-By Report
California	Interim Caries Arresting Medicament	$35.00
Delaware	State reimburses 85% of submitted charges	
Florida		$19.32
Indiana	Description: INTERIM CARIES MED APP Age: 0-20	$98.50
Iowa	INTERIM CARIES ARRESTING MEDICAMENT APPL 1/1/2016	Manual Price-By Report
Kentucky	SILVER DIAMINE FLOURIDE (May bill up to 2 times per six month per quadrant)	$25.00 (for over and under 21)
Mass	Interim caries arresting medicament application	Individual Consideration
Minnesota	INTERIM CARIES ARRESTING MEDICAMENT APPL	Manual Price-By Report
Mississippi	INTERMIN CARIES ARRESTING MEDICAMENT APPLICATION (Not Covered)	$0.00
Missouri	(no description)	Manual Price-By Report
N. Carolina	Interim caries arresting medicament application - per tooth	$10.00
Nevada	INTERIM CARIES MED APP	$12.30
Oklahoma		$22.56
Virginia	INTERIM CARIES MED APP	$32.28
Wash, D.C.	INTERIM CARIES ARRESTING MEDICAMENT APPLICATION	Manual Price-By Report

Not Listed: AL; AK; AR; CO; CT; HI; KS; LA; ME; MD; MI; MT; NE; NH; NJ; NM; NY; ND; PA; RI; SC; SD; TX; UT; VT; WA; WV; WI & WY

DSGA
6/22/2018

D1354 – ADA Guide to Reporting Interim Caries Arresting Medicament Application

Developed by the ADA, this guide is published to educate dentists and others in the dental community on this procedure and its code, first published in *CDT 2016* and revised in *CDT 2018*.

Introduction

CDT code D1354 became effective on January 1, 2016, and has had one revision effective January 1, 2018. This revision was addition of "...**– per tooth**" to the nomenclature. The current full CDT Code entry as seen in *CDT 2018* follows. Please note that the revision is highlighted for emphasis.

> **D1354 interim caries arresting medicament application – per tooth**
>
> Conservative treatment of an active, non-symptomatic carious lesion by topical application of a caries arresting or inhibiting medicament and without mechanical removal of sound tooth structure.

The Code Maintenance Committee (CMC) agreed with the action request submitter that a new code was needed to fill a procedure reporting gap. At that time, and today, the medicament commonly used in this procedure is Silver Diamine Fluoride (SDF). Please note that SDF is not cited in either the nomenclature or descriptor. The CMC determined that the more general term "caries arresting medicament" is more appropriate. This allows reporting D1354 when SDF or another appropriate medicament – as determined by the dentist – is used to treat an active, non-symptomatic carious lesion.

After D1354 was published in *CDT 2016* a need for clarification became apparent as some in the dental community asked how this procedure is to be reported (e.g., by lesion; by tooth). The original intent was reporting by tooth and, as noted above, a clarifying nomenclature revision was approved for *CDT 2018*.

The following pages contain a number of Questions and Answers intended to provide readers with insight and understanding of the procedure, medicaments used, and appropriate documentation in patient records and on claims.

Questions and Answers

1. Is this code principally for reporting the application of Silver Diamine Fluoride?

   No – D1354's CDT Code entry describes a discrete procedure for delivery "of a caries arresting or inhibiting medicament." The dentist providing this service would determine the appropriate medicament to be applied, and the choice is not limited to Silver Diamine Fluoride.

2. What other caries arresting medicament applications could be documented with D1354?

   This CDT Code entry would also be appropriate to document topical application of a 25% solution of silver nitrate followed by 5% sodium fluoride varnish. This technique is described in a Journal of the California Dental Association article that is available online at https://www.cda.org/Portals/0/journal/journal_112012.pdf.

3. Is the procedure reported with this code limited to primary teeth?

   No – There are no words in either the nomenclature or descriptor that limits the procedure to primary dentition.

4. Is the procedure reported by number of lesions treated, or by tooth treated?

   D1354 is a per-tooth procedure. This point has been clarified in the code's CDT 2018 nomenclature revision. The specific teeth treated on the date of service must be documented. Charting and recording of treated teeth are part of the patient's dental record, which should also include information on the number and location of lesions that had the medicament applied.

5. What is the detailed rationale for reporting this procedure by tooth treated?

   The D1354 nomenclature revision mirrors the nomenclature of other procedures in the CDT Codes "Other Preventive Services" category: D1351 sealant – per tooth; and D1353 sealant repair – per tooth. As D1354's original nomenclature lacked such specificity it could be reasonably interpreted, for example, as application of the caries arresting or inhibiting agent to a specified tooth surface, a single tooth or a number of teeth, or all teeth in an area or the oral cavity such as a quadrant.

   This created ambiguity and confusion for appropriate documentation of D1354.

   It is important to report D1354 as a per tooth procedure to track individual tooth outcomes and follow-up procedures in the patient record. Some treated teeth will require reapplication at determined intervals, some will be followed to exfoliation, and others will eventually receive definitive restorative care as individual patient circumstances dictate.

   While no single, exclusive treatment protocol exists for the application of a caries-arresting agent, the clinical protocol adopted at UCSF for the application of Silver Diamine Fluoride (J Calif Dent Assoc. 2016 Jan; 44(1):16–28) has been generally accepted by the dental community of providers and educators. While that protocol does not limit itself exclusively to single tooth application, it is consistent with and lends itself best to such practice.

6. How often may the D1354 procedure be delivered to the same tooth?

   Reapplication may be required when the dentist determines that there is a clinical need. The CDT Code entry does not address application protocols. Literature that discusses SDF delivery protocols and related topics is available online from the National Library of Medicine at –

   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4778976/

7. Does the D1354 procedure preclude a subsequent restorative procedure at a later time?

   A subsequent restorative procedure may be needed at some time after application of a caries arresting medicament.

   Caries is a disease that is treated with the medicament. The lesion in the tooth resulting from the disease (i.e. the cavity) may need a subsequent restoration to restore function.

8. Must there be a specific interval between the D1354 procedure and a restorative procedure on the same tooth?

   No – As noted in the answers to questions 4 and 5, the clinical condition of a patient's tooth is affected by a variety of factors and can change over time. The patient's dentist is in the best position to evaluate the need for restorative services.

9. Does "without mechanical removal of sound tooth structure" in the D1354 descriptor mean that this procedure is for reporting Atraumatic Restorative Treatment (ART) therapy?

   No – ART therapy was not cited in the action request for this CDT Code addition, nor was it brought up during the Code Maintenance Committee's discussion before its vote to accept the action request. The D1354 descriptor does not cite ART when defining the procedure.

10. May other preventive procedures be delivered to the tooth on the same day it receives the D1354 treatment?

    Yes – Other preventive procedures may be delivered as there is no such exclusionary language in D1354's nomenclature or descriptor. Individual circumstances would affect the order in which preventive services are delivered (e.g., prophylaxis before medicament application).

11. May a hygienist or other allied dental personnel deliver the D1354 procedure?

    That depends on individual state dental practice law. State scope of practice acts determine the training, permitting and licensing requirements of persons who may deliver the D1354 procedure, and the level of supervision that may be required.

12. Are there any other medicament delivery procedures that this code would be used to report?

    No – D1354's CDT Code entry describes a discrete procedure for delivery "of a caries arresting or inhibiting medicament..." Any other medicament delivery procedure would be reported by its own CDT Code (e.g., D9910 application of desensitizing medicament); or with an "unspecified, by report" (aka "999") code.

13. How would D1354 be reported on a claim?

    D1354 is reported on the claim detail line. Each claim detail line identifies the particular procedure, the date it was delivered to the patient, and tooth number or numbers involved. If more than one tooth is treated on the same date of service, the procedure may be reported:

    - On one service line that also lists the tooth numbers (or letters) involved in the appropriate field, and the total number of teeth (i.e., Quantity) in the appropriate field
    - On multiple service lines, one per tooth treated, listing the tooth number or letter and a Quantity of 1 in the appropriate fields on the service line

14. What dental benefit plan coverage – commercial or governmental – is anticipated?

    Coverage and reimbursement for D1354 is likely to vary between commercial benefit plan offerings and by state for government programs (e.g. Medicaid). This information can be acquired when verifying a patient's benefit plan enrollment and eligibility for services.

Questions or Assistance?

Call 800-621-8099 or send an email to dentalcode@ada.org

Notes:

- This document includes content from the ADA publication – *Current Dental Terminology (CDT)* ©2017 American Dental Association (ADA). All rights reserved.
- Version History

Date	Version		Remarks – Change Summary
07/17/2017	1	Initial publication	