

The virtual dental home: a critique

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Introduction

The concept of a Virtual Dental Home (VDH) has been developed and implemented by the Pacific Center for Special Care of the Arthur A. Dugoni School of Dentistry in San Francisco (1). It utilizes registered dental hygienists and dental assistants to provide preventive and interim treatment services for children in elementary schools and Head Start centers and for adults in nursing homes and residential assisted living centers, thus improving access to care for these vulnerable populations (2). Dental hygienists (RDH) and assistants (RDA) gather diagnostic data, posting the information to a website for review by a supervising dentist, who decides how the care of the patient is to be managed, including referral to a dentist if necessary. The VDH falls short on a number of accounts, including the failure to meet the criteria of a “dental home” (3). This critique will challenge the Virtual Dental Home and indicate that the utilization of dental therapists rather than dental hygienists/assistants is a more

Abstract

The Virtual Dental Home is a concept of the Pacific Center for Special Care of the Arthur A. Dugoni School of Dentistry in San Francisco. It is designed to improve access to dental care for underserved populations, specifically children and institutionalized adults. This article describes the development and implementation of the Virtual Dental Home, subsequently critiquing the concept. The criteria for a dental home are not met by the program. It is the equivalent of a traditional public oral health prevention and screening program, with the additional dimension of allowing dental hygienists and assistants to place interim glass ionomer restorations in dental cavities. The critique questions the need to insert a “cloud” dentist into the process. The routine utilization of radiographs is also challenged. The VDH not only lacks the attributes of a dental home, it has not been shown to be as efficient and effective as traditional programs staffed by dental hygienists and dental therapists. The article concludes by describing how programs utilizing dental therapists could address the deficiencies of the Virtual Dental Home, effectively improving access to oral health care for underserved populations.

efficient and effective approach to addressing access to care for these underserved populations.

Development and implementation of the concept

The Virtual Dental Home Demonstration Project was initiated in 2010 (1). Registered dental hygienists and dental assistants were specifically trained to perform the expanded functions required in the Virtual Dental Home. They also perform the traditional functions of RDHs and RDAs, which include oral health assessments, intra- and extraoral soft tissue examination, palpation of the TMJ and lymph nodes, prophylaxis, topical fluoride and sealant application, exposure of digital radiographs and photographs, and charting of existing conditions, including obvious carious lesions (4). All these data are transmitted via a website to a supervising dentist—a “cloud” dentist. The “cloud” dentist then determines the treatment to be provided by the RDH/RDA, and if the

patient is to be referred to a dentist for additional treatment that only a dentist can provide.

Their additional function, allowed only in the VDH, is the ability to place an Interim Therapeutic Restoration (ITR), also called Atraumatic Restorative Treatment (ART), in carious teeth. ART was developed in the 1990s in Europe with the endorsement of the World Health Organization for interrupting and treating dental caries by minimally trained community health workers in areas lacking dentists or hygienists (5). The procedure uses hand instruments to remove dental caries from teeth, with the subsequent placement of an adhesive restorative biomaterial (glass ionomer) that seals the carious lesion and releases fluoride to inhibit further decay. There is no drilling and the procedure is painless. The standard international training course for community health workers is 5 days in length (6). Since it is not a surgical procedure, the dental profession accepts its utilization by non-dentists.

By 2014, the VDH project had nine teams, each consisting of a dental hygienist, a dental assistant, and a remote supervising dentist, providing part-time services in 40 community locations that included elementary schools, Head Start and preschool programs, day care centers, and nursing homes (7). In 2014, The Pew Charitable Trust published a study of the VDH program in three elementary schools. Each school was served by a dental hygienist and assistant visiting once per week. The report stated: *“The supervising ‘cloud’ dentist reviews all patient records [transmitted electronically] within 48 hours of the visit. When an ITR might be necessary, the hygienist charts the area of concern, takes digital radiographs and photographs, and flags the file for the dentist to review. ...The dental hygienists are paid for a combined total of about 12 hours a week, seven of which are devoted to clinical care. The remaining five hours are spent on travel, equipment setup and breakdown, processing forms, and other non-clinical tasks. ...Each provider sees four to five children a day when seeing new patients or conducting checkups, and as many as six or seven when conducting follow-up visits. New appointments take nearly an hour; follow-ups are shorter”* (7). According to Pew, the VDH project did not collect data on referral follow-through at the time of its report (Pew Charitable Trusts, personal communication).

The 2016 VDH report states there are now demonstration projects in 11 communities in approximately 50 sites across California (2).

Critiquing the virtual dental home

The VDH does not allow a qualified dental hygienist to diagnose a carious lesion, determine when an ITR is appropriate therapy, or when to refer an individual to a dentist for treatment. Rather, it requires that a dentist be consulted via the “cloud,” a web-based strategy. Following are specific criticisms of this process.

Caries assessment, treatment planning, and interim restorations

An assumption in the design of the project is that a “cloud” dentist can diagnose dental caries based on dental hygienists/dental assistant’s charting, digital radiographs and photographs. The current standard of care in determining the existence of a carious lesion and its advancement is based on the criteria of the International Caries Detection and Assessment System (ICDAS), which requires careful visual inspection of a thoroughly dry tooth (8). A developing carious lesion has the potential to be remineralized (9). Surgical repair and restoration should not be accomplished unless frank cavitation of the enamel is observed visually. Rather, the use of topical fluoride, silver diamine fluoride, and/or sealing the potential lesion should be employed (10). The status of an enamel lesion can be challenging, even by a practitioner with direct visual observation. Making such a determination via teledentistry is beyond the ability of a “cloud” dentist without risk of over- and under-treatment.

Additionally, the VDH regularly exposes digital radiographs for transmission to the “cloud” dentist. Health professionals are increasingly concerned with the amount of x-radiation in healthcare, particularly in children. An international consortium of over 91 organizations, including the American Dental Association, has initiated an “Image Gently” campaign in an attempt to limit x-radiation exposure in children only when it is imperative (11). Yet, the screening procedures of the VDH call for the frequent exposure of radiographs in order that the “cloud” dentist can determine whether care can be by the dental hygienist/assistant, or referral to a dentist is necessary. The exposure of radiographs should never be a routine procedure. It should be based on a thoughtful assessment of caries risk by the dentist ultimately providing definitive, comprehensive care (12,13). It should be noted that radiographs are not a requirement for placing a glass ionomer interim (ITR/ART) restoration. A dental hygienist is qualified to screen patients and recommend referral to a dentist absent the authorization of a “cloud” dentist, which does not require radiographs.

The teledentistry logistics of the VDH project are essentially to authorize a dental hygienist to provide Interim Therapeutic Restorations. An ITR certified dental hygienist is clearly qualified to determine if an ITR is necessary and to perform the procedure. However, restrictive state dental practice acts preclude hygienists from exercising independent judgment, thus requiring circumvention through redundant concepts such as the VDH. These glass ionomer restorations are utilized internationally in multiple settings outside a dental environment, frequently placed by community health workers who have completed the five-day training course (6). Following the recommendation of the American Academy of Pediatric Dentistry (AAPD), the VDH uses the

term Interim Therapeutic Restoration, rather than the internationally accepted terminology of Atraumatic Restorative Treatment. The AAPD emphasizes that it is only an interim or temporary procedure that may be used “When circumstances do not permit traditional cavity preparation and/or placement of traditional dental restorations or when caries control is necessary prior to placement of definitive restorations. . .” (14). On that basis, patients with Interim Therapeutic Restorations placed in the VDH should all be referred to a dentist for follow-up with traditional dental restorations. Accordingly, ITR is a misnomer as applied in the VDH, since it is considered to be a definitive restoration, for which the proper designation is ART.

Referrals to a dentist

The potential for follow-through of a referral to a dentist is questionable on two accounts. First, the problem of accessing dental care for the vulnerable and underserved populations the program serves is complex and multifaceted. Barriers impact the ability of patients/parents to obtain care on the basis of a referral. They include: identifying a dentist willing to care for patients on public insurance; oral health literacy of the patient or family; availability of transportation; and child care for siblings (15,16). Second, while identifying a dentist willing to treat these patients is a significant problem, identifying a dentist to accept a VDH referral is even more problematic. The VDH project will have already billed Denti-Cal (Medicaid coverage of dental services in California) for the examination, radiographs, and preventive procedures. Thus, the dentist who receives the referral cannot assess fees for these services a second time. It would be unusual for a dentist to accept the diagnosis and treatment plan of a “cloud” dentist (unless the “cloud” dentist is also the referral dentist) who had never actually examined the patient, and would then proceed to treat without a further evaluation for which no remuneration would be available. This circumstance creates a significant financial barrier to a successful referral. In fact, the program reports that the majority of children requiring care by a dentist do not receive the necessary care (2).

Concept of a dental home

The concept of a “health home” was developed by the American Academy of Pediatrics for ensuring care for infants, children and adolescents, including developmentally disabled children. It was subsequently adopted by the American Academy of Pediatric Dentistry as the “dental home” (17-19). Elements essential to a dental home are: accessibility, family-centered, continuous, comprehensive, coordinated, compassionate, and culturally competent. The Virtual Dental Home claims to provide “all the ingredients of a ‘health home’” (1). A health/dental home provides comprehensive care, which for children includes managing issues of growth,

development, spacing and alignment of the dentition. There is no evidence the VDH accesses or monitors growth and development issues or specifically refers children with such problems to a dentist. The dental home provides continuous services; the VDH is accessible only when its staff are present at the facility. No provision is made for necessary periodic oral examination (recalls). A dental home is accessible, providing services to participants when they are in need of care. In the VDH, the presence of the dental hygienist/dental assistant is episodic, and neither are capable of providing definitive care for a child with a toothache. Arrangements for children presenting with a dental emergency when the VDH staff is absent must be made by a school nurse or teacher. A true dental home would not have to rely upon others to fulfill its responsibilities.

Once a dentist assumes care for a patient, that dentist has the obligation to be available to the patient for required care at all times. Not to be available when needed is patient abandonment (20,21). This is the reason practitioners must make arrangements with colleagues to provide for their patients when they are not available. Initiating a diagnosis and accepting a professional fee establishes a doctor-patient relationship (20,22). The VDH, with a diagnosis being made by a “cloud” dentist and a fee submitted and paid, establishes a moral and legal relationship with the patient that requires continuing access to care by the dentist. A significant majority (73%) of pediatric dentists do not think a dental home can exist for a child independent of being a patient of record at a specific dental office (19).

Program effectiveness

The program’s most recent report states that it “does not contain all of the data and detailed results of the demonstration project” (2). What limited data are provided, and the manner in which they are provided, makes it impossible to comprehensively assess the program’s effectiveness. However, some evaluation is possible. Over the six year period of the program’s existence, 3,442 patients were seen: 2,862 children and 580 adults. No data are provided on the number of prophylaxes performed, fluoride treatments administered, or sealants placed. It is assumed that essentially all of the patients examined by the hygienists also received these preventive services. There were 604 Interim Therapeutic Restorations recorded for school children, and 535 for adults. However, the data do not indicate how many individuals received these treatments; thus, it is not possible to determine what percentage of patients received such care. As indicated previously, essentially the only novel aspect of the program, from a typical public health screening and prevention program, is the introduction of the ITR. Given the number of ITRs placed, the maximum number of individuals who could have benefitted from this procedure, assuming one ITR/person,

would have been 1,139, the total number placed: 21 percent of school children and 100 percent of adults. However, the actual percentage is likely much smaller given the probability that many individuals received more than one ITR.

Approximately one-third of the children, and one-half of adults in long term care facilities required treatment by a dentist. No data are provided on the number of the adults, if any, actually receiving treatment by a dentist. “For those children *where it could be determined* whether they kept referral appointments,” 41 percent failed to do so (2). [Italics added.] Of those children who kept their appointment, 17 percent did not receive the treatment they required. Thus, the VDH program failed to provide necessary dental care for more than half of those children whose dental problems required care by a dentist.

To date there has been no independent review of the effectiveness of the Virtual Dental Home. Yet, on September 29, 2014, the California legislature authorized expansion of the VDH statewide and permitted billing of Denti-Cal for covered services (23). Subsequently, Oregon has authorized a similar pilot VDH program and it is being considered in other states (2,24).

It is difficult to perceive that providing interim restorations to perhaps less than one-fifth of the children would justify the imposition of excessive x-rays and the additional cost of a “cloud” dentist, when alternative programs have been demonstrated to be more effective.

Financial feasibility

The Virtual Dental Home project is not a financially feasible public health endeavor. The program is sustainable only due to the external grant funding it receives. The Pacific Center for Special Care has acknowledged that “virtual dental home model sustainability requires financial support for activities such as case management, health promotion and education, intensive community-based prevention based on individualized risk assessment, and community-based early intervention procedures” (25).

An effective alternative

The core problem of a Virtual Dental Home, which precludes it from being either efficient or effective, is the inability to have a dental professional at the point of service to provide the basic care required. For community-based public health programs, it is not cost/effective for this person to be a dentist. There are not enough dentists nationwide, much less in California, to provide necessary care for underserved populations (26). The model that has been effective throughout the world, at least for school children, is the school-based dental therapist (27,28). The American Public Health Association, the American Association of Public Health Dentistry, and the

American Dental Hygienists’ Association support dental therapists to increase access to preventive and therapeutic oral health services for underserved populations in the United States (29-31).

Dental therapists have traditionally provided virtually all the basic oral health care needs of children in school-based programs, including health education, permanent restorations, pit and fissure sealants, topical fluorides, pulpal therapy, and simple extractions. They are now also providing basic care for adults in Alaska and Minnesota (32,33). Both dental therapists and dental hygienists can serve institutionalized individuals, with the general supervision of dentists, providing care within their scope of competency. The requirement that a “cloud” dentist determine basic treatment creates insurmountable issues of efficiency and effectiveness, increases costs, imposes unnecessary radiographs, raises moral and legal questions, and delays definitive treatment.

Utilizing dental therapists to provide care for the population that the VDH project seeks to serve addresses essentially all of the deficiencies identified in the VDH model. Except in extraordinary cases, typically requiring the care of a specialist, all of the care required can be determined and implemented by dental therapists at the point of service; referrals are unusual. The impediment of finding a dentist who will accept referrals is eliminated. External case management to ensure a patient in need is referred and has followed through is unnecessary. Additionally, with underserved populations, transportation to a dentist can be problematic and is not necessary when required care is provided in the setting in which the patient is initially examined. There is no need for the expensive and unnecessary involvement of a dentist in the process. There is no need to transmit records to a “cloud” dentist for consultation and approval, thus delaying timely treatment.

The following table compares the functions of dental therapists, dental hygienists, and VDH dental hygienists:

Current scope of practice in the United States	Dental therapist	RDH	RDHEF in alternative practice	VDH RDHEF
Oral exam/assessment*	x	x	x	x
Radiographs, photographs	x	x	x	x
Charting existing conditions	x	x	x	x
Diagnosis	x			
Prophylaxis, sealants, fluoride Tx	x	x	x	x
ART/ITR	x			
ART/ITR—dentist Rx required				x
“Permanent” restorations	x			
Emergency Tx/simple extractions	x			
Direct referral to dentist	x	x	x	
Delay of Tx or referral				x

*Examination of the head, neck and oral cavity, including intra-oral and extra-oral soft tissues, occlusion, TMJ.

Conclusion

The Virtual Dental Home does not meet the criteria for a dental home. Furthermore, it is not a viable strategy to address the issue of access to care for the nation's vulnerable and underserved populations. Despite its complex logistics, additional expenses requiring radiographs, photographs, web-based data recording and "cloud" dentists, the VDH offers minimal benefit over and above what exists in a typical public health screening and prevention program managed by dental hygienists. There has been no independent analysis documenting it to be effective or financially prudent.

Finally, it can be speculated that the VDH evolved as an alternative to the dental therapist movement in the United States, which has been strongly opposed by the national and state dental associations. To address the nation's failure to provide adequate oral health care for vulnerable and underserved populations, the power of organized dentistry in controlling the oral health workforce, when it is not in the public health interest, must be overcome. Legislation authorizing both dental therapists and dental hygienists to care for children and institutionalized adults within their scope of practice and with general supervision by dentists is an imperative to effectively and efficiently meet this pressing need.

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