Click to display a thumbnail listing of pages.

Click to print this PDF file or pages from it.

Click to save this PDF file to your computer.

Click to go to the next or previous page of the PDF.

Click to decrease or increase the magnification of current page. May have to use horizontal scrollbar to view right hand page.
You can change a kid's life.

**Tomorrow's SMILES**
helping prepare teens for success

VOLUNTEER
for this life-changing program at
www.TomorrowsSmiles.org

"Volunteering for Tomorrow's SMILES has been so rewarding. I encourage all dentists to volunteer for at least one case. They will not regret it!"

Kara Henderson, DDS

A special program of:

AMERICA'S TOOTHFAIRY
National Children's Oral Health Foundation®

Program Sponsor
Patterson Foundation

Product Sponsors

Nobel Biocare

100% of your contribution goes directly to helping children in need thanks to these generous Corporate Underwriters:
Tradition vs. Research

by Trisha E. O’Hehir, RDH, MS
Editorial Director, Hygienetown

Toothbrushing is the most common oral hygiene practice in the world today. People have been brushing their teeth for centuries. Reports go as far back as the ancient Egyptians who constructed crude implements with twigs and leaves. Many cultures used twigs over the years and in Africa there is a “toothbrush tree” providing the best branches for chew sticks. Regular toothbrushing with modern day toothbrushes began in Europe at the end of the 17th century. 1780 was the beginning of mass-produced toothbrushes in England, followed by the United States.

Much of toothbrushing is habit or tradition. Most people wet their toothbrush before brushing, a habit from the days when hard bristles were the only kind used in toothbrushes. Hard bristles had to be softened with water before brushing. Today most toothbrushes are made with soft bristles that don’t need to be softened with water before brushing although most everyone still does wet the brush first, purely a habit.

Despite being science-based professionals, dentists and hygienists are taught traditions with no research base. Toothbrushing is one of those traditions. There are many studies comparing one toothbrush to another, a manual toothbrush to a power toothbrush and studies comparing a variety of power toothbrushes. Toothbrushing is assumed to be the most important oral hygiene activity and is therefore essential for oral health. Granted, when compared, toothbrushing removes more plaque than not brushing. That is a scientific fact. However, toothbrushing is such an ingrained habit that consumers and clinicians tend to ignore the scientific fact that toothbrushing doesn’t reach the areas in the mouth at greatest risk of dental disease.

Your basic oral health philosophy changes as new scientific research is presented, new products or ingredients are introduced and as consumer awareness changes. The goal remains the same – optimal oral health. How you believe optimal oral health can be achieved is based on three key elements: scientific research, your personal experience and the preferences of your patients.
Clinical Implications: Both daily oral hygiene and professional dental hygiene visits need to focus on effectively removing interproximal bacterial plaque rather than simply cleaning facial and lingual surfaces.


Mechanical plaque control is still the most effective means of preventing gingivitis and periodontitis. The initial gingival lesion begins within four days of undisturbed plaque growth. Thorough mechanical plaque removal on all tooth surfaces every other day effectively prevents clinical signs of gingivitis. The every-other day, all tooth surfaces approach is more effective than the current practice of daily brushing of facial and lingual surfaces, since these surfaces are at lower risk of developing gingivitis than interproximal surfaces.

Plaque accumulates first on the proximal surfaces of mandibular molars and premolars, followed by the proximal surfaces of the maxillary molars. The maxillary lingual surfaces accumulate very little plaque in comparison.

Rather than repeating tedious, detailed oral hygiene instructions to patients, we should engage them in self-diagnosis to identify areas at risk and a plan to focus oral hygiene on those areas.

Linking is a means of connecting an established habit with a desired new habit. An example is linking interdental cleaning to brushing, by having patients clean between their teeth before brushing. If the new habit is done first, before the established habit, it is less likely to be forgotten, and the established habit will be retained.

Clinical Implications: Toothbrushing only removes 50 percent of plaque and the lower right lingual is the most difficult area to reach.

Video Used to Record Brushing Patterns

Researchers in England used a videotape to document toothbrushing patterns for 85 11- to 13-year-olds and 30 18- to 22-year-olds. The videotaping was done without the subjects' knowledge, a technique no longer possible due to strict rules regarding informed consent of study participants. The patients had agreed to participate in a dental study, but were not told their brushing would be observed. They were simply told to go to the sink and brush their teeth as usual, before beginning the study. The sink and mirror were set up in a doorway, completely shielding from view the room behind which held the video equipment.

The videotapes were reviewed several times to determine toothbrushing sequence, hand preference and time spent in each of 16 sections of the mouth. Maxillary and mandibular sextants were divided between facial and lingual, accounting for 14 areas, plus occlusal surfaces in each quadrant for a total of 16 sections.

Toothbrushing began most often on the maxillary facial surfaces, with a cross-arch start for most brushers, that is, right-handed brushers started on the left side and left-handed brushers started on the right side. Only two people brushed with both hands and nine people were left-handed.

The pattern observed most often was erratic, with the brusher returning several times to the first area brushed, which was a maxillary facial surface. Forty-five percent of the study subjects neglected the lingual surfaces entirely, while those who did brush the lingual surfaces spent only 10 percent of their brushing time in that area, usually leaving it until last.

The average time spent brushing by the 11-13-year-olds was 60 seconds in sharp contrast to only 38 seconds for the 18-20-year-olds.

The authors concluded that individualized, as well as group instructions, and printed information on tooth brushing should stress lingual and palatal brushing, since these areas are so frequently missed. The importance of toothbrushing patterns was established by this study.

**Clinical Implications: Videotapes revealed erratic brushing patterns with little or no time spent on lingual surfaces.**


Dry Brush Inside First

Toothbrushing instructions focus primarily on brush placement and brushing stroke without focusing on where to start or what order the teeth should be brushed.

Twenty-nine private practice RDHs across the United States tested the “dry brushing inside first” approach on a total of 126 recall patients. Baseline data included bleeding on probing and calculus scores measured on the lingual surfaces of the mandibular teeth.

Patients were simply instructed to brush the inside of their bottom teeth first with a dry toothbrush, no water and no toothpaste. They were instructed to brush their entire mouth without toothpaste until teeth felt clean and tasted clean. Then they rinsed their brushes with water and brushed again with toothpaste. Bleeding and calculus scores were recorded again at their next recall visit, an average of six months later.

Bleeding scores were reduced 55 percent overall. Calculus scores were reduced 58 percent for all mandibular lingual surfaces and 63 percent for the anterior section alone. Notes from the examiners indicated that patients reported brushing longer than usual as a result of this approach. Some of the patients were so excited with the results that they made unscheduled visits to the dental office to point out their lack of calculus and improved gingival health.

**Clinical Implications: Instructing patients to dry brush first until the teeth feel clean and taste clean and then add toothpaste will lead to longer brushing times and more effective plaque removal.**


continued on page 4
Clinical Implications: Xylitol consumed several times each day will reduce plaque levels approximately 50 percent when compared to plaque levels in a sucrose diet.


The Hawthorne Effect

From 1924 to 1927, research was conducted at the Western Electric Company, Hawthorne Works, in Chicago, to evaluate the effect of illumination on worker efficiency. Rather than demonstrating a correlation between room light and productivity, they showed worker efficiency increased simply by participating in the research. This has become known as the Hawthorne Effect.

The first experiment compared three departments exposed to room illumination increased at different rates. One department showed fluctuating production, and the other two departments showed production increases seemingly independent of the increase in illumination.

To control for differences in work and workers, the second experiment was conducted in a single department with workers of similar age and experience. A control group was established that worked under standard illumination while the test group worked under variable illumination intensity. Results for both groups showed a steady and nearly identical increase in production.

Thinking that the combination of natural and artificial light might have influenced the first two experiments, the third experiment tested only artificial light. The control group worked under constant light of 10 foot-candles, while the test group started at 10 foot-candles and decreased in one foot increments to three foot-candles, at which time workers protested the darkness and production decreased. However, production had steadily increased for both groups until a level of three foot-candles had been reached in the test group.

The phenomenon of improvement simply because of participation in a research study has become known as the Hawthorne Effect. This effect is often apparent in oral hygiene studies. Improvements of up to 35 percent for plaque and gingivitis scores are reported for study subjects when their actions will be evaluated but no changes are made to their oral hygiene routine.

Clinical Implications: To improve oral hygiene, simply tell all your patients they are part of a research study!

bacterial biofilm and that flossing isn’t actually very effective. Toothbrushing shouldn’t be our primary approach to controlling plaque forms and where gingivitis and caries begin will provide greater value in return for the time spent.

Next are the studies identifying the most effective approaches to disrupting bacterial biofilm. This also includes an evaluation of which traditional approaches work and which don’t, plus a look at innovative approaches that work as well, if not better than, traditional means. Before embarking on “evidenced-based decision making” between various toothbrushes or floss products, look to the research to determine if today’s traditional approach is actually on target. Tradition suggests toothbrushing and flossing to be the foundation of any successful oral hygiene program. Rather than giving every area in the mouth the same degree of attention and time, targeted oral hygiene will focus the limited time now spent on oral hygiene on the areas in the mouth at greatest risk and will provide greater value in return for the time spent.

Over the years, many classic research papers have been published dealing with basic oral health facts that create a foundation for your prevention philosophy. Identifying areas in the mouth at greatest risk of dental disease provides the basis for developing an effective oral hygiene program. Rather than giving every area in the mouth the same degree of attention and time, targeted oral hygiene will focus the limited time now spent on oral hygiene on the areas in the mouth at greatest risk and will provide greater value in return for the time spent.

Next are the studies identifying the most effective approaches to disrupting bacterial biofilm. This also includes an evaluation of which traditional approaches work and which don’t, plus a look at innovative approaches that work as well, if not better than, traditional means. Before embarking on “evidenced-based decision making” between various toothbrushes or floss products, look to the research to determine if today’s traditional approach is actually on target. Tradition suggests toothbrushing and flossing to be the foundation of any successful oral hygiene program. Rather than giving every area in the mouth the same degree of attention and time, targeted oral hygiene will focus the limited time now spent on oral hygiene on the areas in the mouth at greatest risk and will provide greater value in return for the time spent.

Next are the studies identifying the most effective approaches to disrupting bacterial biofilm. This also includes an evaluation of which traditional approaches work and which don’t, plus a look at innovative approaches that work as well, if not better than, traditional means. Before embarking on “evidenced-based decision making” between various toothbrushes or floss products, look to the research to determine if today’s traditional approach is actually on target. Tradition suggests toothbrushing and flossing to be the foundation of any successful oral hygiene program. Rather than giving every area in the mouth the same degree of attention and time, targeted oral hygiene will focus the limited time now spent on oral hygiene on the areas in the mouth at greatest risk and will provide greater value in return for the time spent.

Research can be used to develop your preventive philosophy and can also be brought into discussions with patients about the most effective oral hygiene approaches to follow. It’s time to break away from traditions that do not provide the best outcomes possible and look to the research for answers and guidance. Scientific research together with the experience of the clinician and the preferences of the patient are more likely to achieve greater oral health than continuing with the brushing and flossing tradition.

What is the Research Base for Daily Oral Hygiene?

The primary reason oral hygiene instructions are given to patients is to prevent both caries and periodontal disease. Toothbrushing is the most commonly taught approach, despite the fact that caries and periodontal disease affect proximal surfaces more often than surfaces reached by a toothbrush. The smooth surfaces at greatest risk for caries and periodontal disease are the surfaces between the teeth, not facial and lingual where the toothbrush reaches. For that reason, Axelsson et al. recommends that daily oral hygiene begin between the teeth on interproximal surfaces first, before toothbrushing.

Since the proximal surfaces are at greatest risk, toothbrushing should not be taught first. Toothbrushing is taught first based on tradition, not a clear focus on preventing or controlling disease. Toothbrushing is taught first because it’s considered easier to do than flossing. Others teach toothbrushing first because that’s the one basic oral hygiene task performed daily by nearly all adults. Just because that’s a fact doesn’t make it a sound scientific decision. Since disease begins between the teeth, daily oral hygiene between the teeth should be mastered before toothbrushing.

Toothbrushing

After the bacterial biofilm has been disrupted on all the proximal surfaces, only then should the focus be turned to brushing. Interestingly, toothbrushing isn’t very effective. Toothbrushes, either manual or powered, are simply a stick with bristles. Effective toothbrushing depends completely on proper placement of the brush head, proper motion of the manual brush or powered brush and adequate time to effectively disrupt the bacterial biofilm. Not everyone has the dexterity or the attention to focus on proper brush placement and brushing. Children, those...
with arthritis, the elderly and those in the hospital often fail to effectively brush their teeth. In many research studies evaluating either professional toothbrushing or at home brushing the effectiveness of plaque removal is about 50 percent at best.

Toothbrushing instructions suggest following a systematic pattern that does not reflect a needs-based approach. It makes sense to begin brushing the areas at greatest risk of bacterial plaque biofilm formation and gingivitis. According to research published by DeVore, et al., the area at greatest risk is the lower lingual, specifically the right side for right-handed brushers and left for left-handed brushers. However, toothbrushing brochures and packages suggest brushing front teeth first, the area at least risk of biofilm accumulation and gingivitis. This anterior-first approach is based on tradition and perhaps the idea that showing brushing on the facial surfaces of the anterior teeth is easier than focusing on the areas at greatest risk of disease. Proper brush placement to reach posterior mandibular lingual areas is more difficult and requires more patience and instruction for patients to successfully achieve.

Despite the efforts of dentists and hygienists to convince people to follow a systematic approach to brushing that covers all surfaces equally, research published by MacGregor and Rugg-Gunn demonstrated that toothbrushing patterns are erratic and not methodical. When observed and recorded with a hidden video camera, these children and young adults began brushing on maxillary facial surfaces corresponding to the hand they use to hold the toothbrush and returned to those areas several times during brushing. Rarely were the lingual surfaces ever brushed. Only 10 percent of their brushing time was spent on lingual surfaces. Total brushing times for these subjects varied from 38 to 60 seconds. Ten percent or 3.8 to six seconds isn’t much time to brush the area at greatest risk for plaque accumulation and gingivitis. This study was done before rules were in place to inform study subjects they were being videotaped. For that reason, this study is now a classic that can’t be repeated. Telling patients they will be videotaped while toothbrushing will result in brushing times much longer than normal.

In an effort to reduce calculus formation on the lingual of the lower anterior teeth, hygienists and dentists have told patients for years to brush the inside of the lower front teeth first. A study published in JADA in 1998 by O’Hehir and Suvan confirmed what clinicians already knew. Instructing patients to dry brush inside first, brushing all the teeth in the mouth until the teeth felt clean and tasted clean resulted in a reduction in lingual calculus of 63 percent and a reduction in bleeding of 55 percent. It makes sense to instruct patients to begin toothbrushing in the area at greatest risk of plaque and calculus accumulation and gingival bleeding. Simply changing the toothbrushing pattern will impact effectiveness.

**Most Effective Biofilm Removal**

Xylitol is a natural sugar that bacteria can’t metabolize. Xylitol also interferes with acid production by the bacteria and breaks down biofilm integrity. Early studies with xylitol showed an amazing reduction in plaque levels when consumed several times each day. When consumed three to five times daily, xylitol reduced plaque accumulation by 50 percent. Interestingly, toothbrushing also reduces plaque by 50 percent. Toothbrushing depends on the dexterity of the person holding the toothbrush. Xylitol works no matter what the dexterity. By using xylitol daily the first 50 percent is removed no matter what the toothbrushing skill level. There is no skill needed, simply chew gum, suck on candy or use toothpaste, mouthrinse, gel or dry mouth spray sweetened with 100 percent xylitol. Perhaps focusing the toothbrushing on areas at greatest risk will then reach a higher percentage of plaque reduction. This is especially true for those who are unable to even remove 50 percent of plaque with a toothbrush. It makes sense to encourage people to use xylitol daily to control plaque biofilm. Based on these findings, xylitol consumption should be the method of choice for disruption and prevention of plaque biofilm forming on facial and lingual surfaces.

The research supporting daily xylitol use has accumulated for the past 40 years, long enough to confirm original findings and determine dosage suggestions. Xylitol research studies don’t directly compare toothbrushing with daily xylitol use, but clinicians determined to help patients achieve the best oral hygiene possible will see xylitol as an option to reduce plaque biofilm with something easier to use than a toothbrush. This shifts the emphasis from toothbrushing instructions to discussions about plaque biofilm formation and disruption using xylitol.

**The Hawthorne Effect**

The participation in a research study motivates people to do better than average work. This is called the Hawthorne Effect. In oral hygiene studies, the Hawthorne Effect is responsible for more plaque removal and reductions in bleeding when subjects are told to continue doing their regular oral hygiene. This research phenomenon can be used to achieve better oral health in your patients. If ever you find yourself rushed and with no time to discuss oral hygiene, simply tell patients they are in a research study and they should continue doing their regular oral hygiene. Let them know at the next visit bleeding and plaque scores will be measured. Of course, some will completely forget what you’ve told them by their next visit, but for those who take it seriously, you should expect to see a 35 percent reduction in plaque and bleeding, due to the Hawthorne Effect. Simply participating in a research study motivates people to do their best. Why not put all your patients into a research study?

Check out this month’s Perio Reports for summaries of the classic research studies mentioned in this article. These studies provide a basis for discussion and debate among your team members as you define and refine your prevention philosophy as it relates to toothbrushing. Have fun with this topic and push the edges of your traditional philosophy. You might even become comfortable telling patients to skip toothbrushing and start cleaning in between.
“Open wide” is merely the opening line of an engaging story between you and your patients.

From there, the conversation moves to how much they love skateboarding, eating vanilla swirl ice cream, or family picnics.

By delivering great oral care in the office, your patient’s journey to a healthier mouth and more fulfilling mindset has begun. Our at-home patient-based solutions help them continue a great oral health routine after they leave. We share your passion for helping patients more fully engage in their lives, whether it’s acing that job interview or making plans for that white wedding. Stories you’ll hear more about at their next visit.

To see the compelling solutions tailored for your patients, please visit dentalcare.com.
Research is part of any volunteer trip providing oral health care. Asking questions and seeking answers. That’s how I looked at my AD World Health trip to the Manjushree orphanage in Tawang, India a few years ago. It was primarily a medical trip to assess medical needs based on reports of eye and skin problems. My task was to collect information on basic oral health needs of the children in order to plan future dental visits providing the necessary restorative care. Of course I also provided oral hygiene instructions and brought several copies of my cartoon book, The Toothpaste Secret.

Things are not always as they seem. The eye and skin problems were directly related to the location of the orphanage, at 10,000 feet. Children often had school classes outside in the sun and in winter, the sun reflected off the snow creating both eye strain and sunburn. Sunglasses and hats quickly remedied those problems.

Other problems encountered during our visit were due to poor general hygiene and shared toothbrushes. The children all had lice, which was treated primarily by short haircuts and secondarily by shampooing with anti-lice soap. They all seemed to have a runny nose and cold. This was attributed to the lack of basic hand washing and the shared toothbrushes. Teaching how to correctly wash their hands and making sure hands were washed after going to the toilet and before meals was new for them.

Toothbrushing was done with communal toothbrushes. A basket of brushes was available in the boys and the girls bathroom. Children simply took a brush when it was time to brush and tossed it back when they were done. To ensure that each child had their own toothbrush, a toothbrush holder with places for 60 brushes was devised from a long plank of wood. Each child was assigned a numbered slot. Now kids can keep from sharing toothbrushes. For the first time, the children were able to have their own toothbrush.

Oral health data gathering was done by creating a dental chart for each child to identify the general dental needs of the group. This information was then available when a dentist next visited the orphanage. All the children seen the first day were dentally healthy. This was a pleasant surprise. When I mentioned this to the monk in charge he asked if I was now ready for the “bad” ones. Those were the children I saw the next day with a lot of caries.

Anticipating the need for some extractions of deciduous teeth, forceps and anesthesia were packed for the trip. Eight children with abscessed deciduous teeth were anesthetized and the teeth extracted. Later that night I visited the children as they were being put to bed, to be sure all the gauze was removed from their mouths and that they were all doing fine. The next morning, a long line of children was waiting for the dental clinic to open. Surprised at this, I asked the teacher why the children were there before we were ready for them. The teacher replied that the children came themselves and after questioning them it became clear and very surprising to me that each child wanted a tooth extracted! Upon further questioning it seemed they all wanted a tooth extracted because the day before, the children who had teeth extracted were given special attention when I visited their dorm, gave them a hug and tucked them into bed. They all wanted the same. I reassured them I would hug and tuck them in without extracting a tooth!
Evidence-based DH – How Much of What We Do is Science-based?

Sometimes tradition rather than research dictates how we treat patients.

Sadly, much of what we do routinely as RDHs is not supported by research. So far, no one has called us on it, but big insurance companies and large, multi-center practices will soon have the data to either support or negate our traditions. One in particular – recall intervals. What DH research do we have to support our recommended intervals? As you go through the treatment you provide your patients each day, what research can you point to for each thing you do? If patients haven’t asked you for the evidence before, they might soon begin.

Most of my adult patients are on three to four month recalls. I give them the scientific rationale for this interval by explaining the nature of the biofilm. Some time ago we shared some great literature on this very thing, on another thread. Because some new patients were previously accustomed to the traditional six-month recall (which has no evidence to support it), I have developed my explanation pretty well. Also, thanks to Trisha and others, I can produce the evidence if asked to by a patient.

I guess in due course, the condition of their mouths will provide some evidence also.

Let’s look at each aspect of the DH visit and tie the research to it.

I’ll start with toothbrushing – dry toothbrushing in particular. I’m still amazed that DH schools don’t teach this and so many hygienists have never heard of it and many who know about it don’t teach it. It’s so simple and makes such a huge difference. Here are surprising results from the January 2011 poll.

Do you teach dry toothbrushing followed by toothpaste?

- 39% Yes
- 47% No
- 14% I am unaware of that approach

506 votes

Dry toothbrushing has been evidenced-based for me and my patients. Most doctors aren’t sold on it, some don’t even like when I suggest it. They often say it’s too damaging. But I have only seen great results and not damaging results. It is demonstrated in the patients’ mouth so they can feel how little pressure is used.

It probably has been the most appealing, easy and effective thing I can teach my patients.

Really interesting. It goes to show how results of research are seldom what we would expect.

How about fluoride treatment every six months? How effective is it really? Which
form of fluoride is most effective for adults, is varnish really the best option? Would a weekly self-applied fluoride rinse be better for primary prevention of caries?

My boss is implementing daily fluoride rinses for high-risk patients: fluoride daily for three weeks and chlorhexidine rinses for one week per month.

Hi Linda, I’m presuming your referring to high-risk caries? A couple of points that your boss might want to consider: I would suggest the fluoride rinse as an adjunct and use in the middle of the day based on no research whatsoever, except that I don’t personally see the point in using a fluoride rinse after brushing with a high-fluoride toothpaste. I’m presuming your high-risk patients are using 2800ppm F or 5000ppm F?

I’m anti chlorhexidine for high-risk caries as it does nothing for the pH accept makes it worse and the evidence against *strep mutans* is suspect.

I would get them to use a xylitol rinse instead as it’s effective against *strep mutans*, works synergistically with fluoride and helps the pH. Managing the pH is key to caries (as you know).
The Lightest is now even **Lighter!**

Smaller Optics  Lighter Cable  Optimum Comfort

**Designs for Vision** introduces the **LED DayLite UltraMini**

The Lightest Mini LED!

- 30% Lighter
- 20% Thinner
- Wider Spot Size
- Greatest Range of Light Intensity
- Longer Battery Life

**SEE it Even Better –**

All LED headlights and Custom Dental Telescopes available with a 45 Day, NO Obligation Trial

760 Koehler Avenue | Ronkonkoma, NY 11779 | 1.631.585.3300 | **1.800.345.4009**
info@DesignsForVision.com | [www.DesignsForVision.com](http://www.DesignsForVision.com)
“Open wide” is merely the opening line of an engaging story between you and your patients.

From there, the conversation moves to how much they love skateboarding, eating vanilla swirl ice cream, or family picnics.

By delivering great oral care in the office, your patient’s journey to a healthier mouth and more fulfilling mindset has begun. Our at-home patient-based solutions help them continue a great oral health routine after they leave. We share your passion for helping patients more fully engage in their lives, whether it’s acing that job interview or making plans for that white wedding. Stories you’ll hear more about at their next visit.

To see the compelling solutions tailored for your patients, please visit dentalcare.com.