10 Misconceptions Regarding Dental Hygiene

Dental hygiene is not a new concept: Even 5000 years ago, Aegyptians and Babylonians used various cleaning and healing pastes, tooth picks, soaked and frayed sticks and roots for hygiene procedures... with somewhat dubious results, judging from the state of the average mummy's teeth. The Chinese are credited with the invention of the toothbrush: Around 1400, the first brush-shaped hygiene tools were fabricated from bamboo and pig bristles in the Far East empire. European toothbrushes, too, used to be artisanally manufactured objects from animal bristle, bone and other natural materials – and, until the first third of the 20th century, owning and using them was mostly reserved for the upper classes.

The advent of nylon – the material of contemporary tooth brush bristles – and plastic made cheap mass manufacture of toothbrushes possible, thus rendering regular dental hygiene an option for „common people“, too. With the changing dietary habits in the industrialized countries, common diets becoming dominated by caries-promoting white flour and sugar, this surely happened not a day too soon! Daily brushing became fully established throughout the population in the second half of the 20th century. In the United States, the army is said to have played a positive role in the matter: Soldiers were encouraged to form good dental hygiene habits during their service, kept them up and spread the word after returning home from WW2.

Today, in many families, brushing (by the proud parents) begins with the first baby tooth that pokes through, and preschool children are taught to brush independently. Good for them! Still, we might want to interrupt the well-rehearsed scrubbing routine for a moment, revisiting the dental hygiene ideas most of us have internalized at an early age. Some of those, in fact, have been handed down from generation to generation rather mindlessly, and not all of them have passed the test of time …

Here, we have collected a list of widespread misconceptions and mistakes about various dental hygiene issues – please take a chance to brush up on brushing, flossing & Co.
You have more questions or would like to be advised personally on the subject of dental hygiene? Just give us a call or drop us an email:

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1. Brushing is war!

Can't afford to be soft in the war against those rogue caries bacteria … right? Many have internalized the war metaphor, and have been scrubbing away with all their might from left to right and back again since they can remember.

The truth, however, is that a rough brushing „technique“ can even harm your teeth. If you do that three times a day, as almost universally recommended, you risk hurting your gums and – even worse – abrading your dental enamel. Dentists see patients today who have scrubbed off significant parts of their enamel for good, all the while being convinced they had the gold standard in dental care solidly nailed.

Dental enamel appears very hard – and it actually is: It is barely affected by millenia in an Aegyptian sarcophagus, or by temperatures above a thousand degrees Celsius. In the oral cavity, of all places, the enamel surface can turn soft and vulnerable, though. The mineral calcium hydroxyapatite, the main component of dental enamel, is chemically a salt and, like all salts, has a tendency to dissolve in fluids (even though way less than, say, kitchen salt). In the watery environment of the oral cavity, dental enamel is thus in an equilibrium between its solid and dissolved mineral constituents. When enamel is dissolved, there remain delicate scaffolding structures on the surface of the tooth that guide reattachment of the enamel minerals. If we brush while these structures are exposed, we may end up destroying them with a hard toothbrush or too much pressure, taking away the possibility of surface remineralization and making the dental enamel layer a little bit thinner.

Of course, the positive effects of brushing outweigh the potential damage by enamel abrasion. Still, awareness has risen in dental medicine that there may be a problem with too hard and too much brushing. This has led to modifications in dental hygiene recommendations: The use of hard toothbrushes and the application of high brushing pressure are strongly discouraged today.

2. The more (and longer), the better?

Is it really best to brush for five minutes after each meal? Such advice could be heard from dentists until not such a long time ago – and some patients have followed it ardently. With such adamant brushing habits, you have indeed a very good chance to remain caries-free. The trade-off, however, is that enamel abrasion (as described above) may present a very real danger.

Taking everything into consideration, this is the most balanced advice a dentist can give you today: Brush twice daily for two minutes, focus on what you're doing, and brush gently, but thoroughly. This way, you keep your caries and periodontitis risk low while also giving your enamel a break. Still, generalized advice is not always the best advice. Only a dentist that has regularly seen you in his office can really gauge your individual risk profile and tailor his recommendations to your dental health needs.

3. Technique is essential?

Clearly, scrubbing wildly back and forth is not quite the best brushing technique. But what about the recommendations from dentists, hygienists, school nurses, magazine authors and everybody else who is more (or less) in the know about dental health matters? Rotating movements? Always massage from red to white? Tiny vibrations, combined with sweeping movements?

An article that was published in 2014 in the reputable science publication „Nature“ nailed it: Evidence for or against this or that brushing technique is very very sparse. All the various recommendations given by dentists, toothbrush manufacturers and professional societies in different countries rest on only the flimsiest of factual knowledge – mostly, they have been copied from textbooks and other publications from the first half of the 20th century without being subjected to any kind of scrutiny.

Of course, this is not an argument *against* any of those techniques. But it doesn't support claims that one or the other of them was *the best way* to brush your teeth, either. Take it as good news: According to the available evidence, you don't have to feel like a failure if you can't manage to combine those tiny vibrations with sweeping movements. Simply hold the toothbrush at a slight angle when cleaning the sides of your teeth, and straight when cleaning your masticatory surfaces. Start brushing with gentle, not too expansive horizontal movements. Concentrate of the gum line where tooth and gums meet, and on the masticatory surfaces of your molars. Most plaque is found right above the the gum line, and most food residue is stuck in the tiny fissures of the molar surfaces (and in between teeth – a case for flossing!). And don't forget the back sides of your teeth!

4. Can't beat electric?

Electric toothbrushes are surely better than the humble manual brush, right? Actually, the verdict is not yet spoken: Comparative studies on the subject – the scientific way to answer questions like that – are relatively rare. The few investigations that have been conducted over the years were comparatively small in scope and arrived at quite different conclusions. One thing, however, was found almost unanimously: Electric toothbrushes are easier on the gums. Expectations that they would remove plaque more efficiently, too, have been confirmed in some studies, but were disappointed in others.

Just because it has a motor doesn't mean you can't do a bad job with an electric toothbrush – although some feature electronic timers to make sure each quadrant of the jaw receives roughly the same attention, somewhat reducing the risk of „corner cutting“. The oscillating head of the electric brush is a good brushing tool – but the responsibility to really clean all dental surfaces thoroughly is still yours.

Electric toothbrushes are a godsend for the elderly and for everyone with limited flexibility of their arms and hands due to arthiritis or other problems. Children who tend to loose patience when it

comes to thorough brushing may be more motivated and achieve better cleaning results with a whizzing, humming electric brushing tool. I like to recommend electric brushes to my periodontitis patients, too, as they are proven to be more gentle towards the gums.

Everybody else is free to use the motorized alternative – or a soft or medium manual brush. The latter will achieve absolutely comparable results if you put it to work thoroughly for two minutes.

5. Nice and large, and with a lot of extras?

Too large and too hard: Though bought with the best of intentions, many toothbrushes are not ideal.

Hard bristles may abrade dental enamel, as described under point 1. Plus, they may hurt your gums. Toothbrushes that are too big tend to fail in the matter of reaching the fronts of the last molars and the back sides ot the incisors: If the tooth brush head is too long, the bristles don't reach these surfaces comfortably on account of the arched jaw.

A bended toothbrush handle is useful for reaching the last molars. All other gimmicks a toothbrush might or might not have are generally judged to be more or less superfluous by dentists (as long as said dentists don't have fruitful business relations with toothbrush manufacturers...).

6. Who needs flossing?

Some people just can't get used to regular flossing. „We never used to do that before“, they might argue, „I brush very thoroughly though“, or „I thought flossing was just for people with braces or dental reconstructions“.

Those are not valid excuses. Brush as diligently as humanly possible – there will still be spots in your mouth that remain untouched by the brush. Interdental spaces trap food residue, they contain bacterial plaque and are a haven for microorganisms working quietly and secretly on hidden caries and/or gum inflammations. This is why you should floss – daily, for best results. Still, if your weeker self prevails on every other day, or even if you manage to floss only once a week: That's better than not at all.

There is voluminous floss for larger interdental spaces, threadable floss for cleaning under bridges, regular and very fine floss for regularly or narrowly spaced teeth. Experiment with different kinds to find the one that works best for you, or seek your dentist's recommendation. Waxed or non-waxed is a matter of personal taste: The wax-coated kind slides between teeth a little more easily, plus it rewards users with a minty flavour we associate with cleanliness. However, both kinds actually clean equally well – if you put them to work.

7. Only white teeth are healthy teeth?

We not only think that white teeth are beautiful – we associate them with health to boot. A misleading idea – teeth with a naturally yellowish or greyish hue can be fit as a fiddle. And subjecting teeth to the daily grind of brushing with a „Whitening“ toothpaste will not do them any good at all, health-wise. Whitening toothpaste contains a lot of abrasive particles that sand plaque and discolorations off the teeth, but unfortunaltely don't stop at the dental enamel. With some enamel scrubbed off, teeth may look even darker due to the yellowish dentin shimmering through the thinned-out enamel. This may motivate more and heartier scrubbing – until the irreplaceable enamel is almost completely gone from the tooth necks.

If your teeth are naturally yellow or gray, no amount of „Whitening“ toothpaste will get them white, as these products can tackle only superficial discolorations. Have your heart set on whiter teeth? Ask your dentist for a bleaching! The bleaching chemicals can really lighten the intrinsic color of your teeth – and, contrary to widespread opinion, they cause way less damage then regularly using abrasive toothpaste.

If your enamel is robust, using a „Whitening“ product once a week to remove plaque and discolorations from smoking, coffee, tea, red wine, berries and spice is OK. Ask your dentist how your enamel is doing – if it shows signs of abrasion or erosion, this beauty routine is not for you!

8. Fruit juice – a healthy choice?

Everybody knows you should drink a lot to stay healthy. And fruit juice is the right choice, since it contains lots of vitamins, right?

Not really: Even from a dietary point of view, juice is not very desirable, because it delivers a lot of sugar and no fibre. From the standpoint of dental health, the regular consumption of fruit juice is not recommendable either: Bathing your teeth in a sugary, acidic liquid for longer stretches of time is bad, no matter how many vitamins it has. Juice or soft drinks stretch the buffering capacity of the saliva beyond its limits and lower the pH in the oral cavity. This, in turn, softens and dissolves dental enamel – dentists talk about enamel erosion.

If you were a chemistry crack in high school, you might be interested in the chemical goings-on during enamel erosion – the same mechanism is responsible for cavity formation, too (if not, just skip this paragraph):

Calcium hydroxyapatite, the mineral component of dental enamel, dissolves somewhat in a watery environment, releasing calcium, phosphate and hydroxyl ions. Hydroxyl ions are alkaline OH-groups. If you add an acid to an alkaline, neutralization happens: alkaline hydroxyl ions and acidic hydrogen ions combine to form water. If this happens around dental enamel, the hydroxyl ion won't be present in the chemical equilibrium of the dissolved and undissolved enamel components anymore,

which will force more enamel into the dissolved state. (The other way round, you could also add an alkaline to saliva, thereby raise the hydroxyl ion concentration and force some mineral back into the solid enamel: This is why alkaline water and alkaline mouthwashes are good for your teeth.)

Bathing your teeth in acidic drinks for longer periods of time, you could actually watch the enamel dissolve under a microscope. By the way: Even an extended water bath cannot be considered alltogether harmless, as it dilutes saliva and thereby lowers the concentrations of the dissolved enamel components!

9. Brushing after meals – no time to loose?

There is a German nursery rhyme about not forgetting to brush after eating that no German-raised person will ever be able to forget („Morgens, abends, nach dem Essen – Zähne putzen nicht vergessen!“). However, rhyme or not, it is counsel in dire need of modifying, and everybody should replace it by: Wait at least half an hour after meals before brushing!

This modification of an oft-given advice is grounded in the reality of the chemical goings-on in our oral cavities. As mentioned before, a small percentage of the mineral components of dental enamel will always be dissolved in saliva. If oral pH is neutral or alkaline, enamel will be overwhelmingly present in the solid, mineralized form. Acidic pH moves the balance towards demineralization (see point 8): Minerals from the enamel surface dissolve in the saliva, leaving a protein scaffolding that guides enamel remineralization as soon as the pH is back to neutral.

Oral pH gets acidic after consuming acidic food or drink, but also after ingesting sugar and white flour, as bacteria in the dental plaque turn carbohydrates into lactic acid. If you brush while your oral environment is still acidic, you run the risk of scrubbing the exposed protein matrix off the dental surfaces, taking away the structures that facilitate enamel remineralization.

Better give your saliva a chance to neutralize oral pH before brushing! Half an hour is a good estimate for when it is safe to brush again after eating fruit, salad or pickles and drinking wine, lemonade or juice. If you can't wait to become active for your dental health, chew some sugar free gum. Chewing stimulates saliva production and thus speeds up oral pH recovery. Alternatively, you might set free your gourmet persona and finish each meal with a bit of cheese as the French like to do. Cheese is proven to prevent caries!

10. The fluoride conspiracy

The debate about fluoride is raging since about the 1950s – with new heights reached in the era of the internet. Drinking water fluoridation, practiced in many US-american communities, has been badmouthed both as a communist conspiracy aimed at weakening America and as a plot of the „ruling classes“ to make the „common man“ dumb and submissive.

In Europe, there were some trials with drinking water fluoridation until the 1970s (Austria always held its distance), but due to concerns about „forced medication“, the practice has been widely given up, with the exceptions of the United Kingdom and Ireland. Today, we consider the topical application of fluoride in the form of fluoride-enriched toothpaste to be a more appropriate and safer way of caries prevention. But even toothpaste with fluoride has aroused some fears. Why?

Some of the persistent concern might be due to a misunderstanding: Fluoride is not fluor. Fluor is a highly reactive gas that belongs into the same chemical category as chlorine. Fluorides that are added to toothpaste, in turn, are fluor salts. Compared to fluor, they are about as dangerous as sodium chloride, our kitchen salt, is compared to the aggressive chlorine used to treat swimming pool water.

Sure, it is always the dose that makes the poison: That is true for fluoride as much as it is true for chloride (clearly, eating spoonfuls of kitchen salt is not a good idea either). But the problematic fluoride doses are much larger that what you might accidentally ingest while brushing your teeth (anyway, you're supposed to spit out the toothpaste instead of swallowing it, tasty as it may be – make sure your children understand that, too!). A kid would have to eat an entire tube of toothpaste (and a grownup several tubes) to even come near a fluoride poisoning.

Too much fluoride can cause white spots on the teeth, so-called dental fluorosis (and way too much fluoride does make teeth brittle). In countries with drinking water fluoridation, dentists will sometimes see this condition in people who drink lots of tapwater or use a toothpaste with fluoride addition to drinking tapwater. It may also occur in children receiving oral as well as topical fluoridation (fluoride pills and fluoride toothpaste). Granted, this is not ideal – but a small price to pay for markedly reduced caries rates in all countries that practice/encourage one or the other form of fluoride prophylaxis.

Fluoride prevents caries – that is completely beyond doubt. Behind the explanation that „Fluoride hardens dental enamel“ stands the following chemical rationale: Fluoride ions replace hydroxyl ions in the enamel mineral calcium hydroxyapatite. The resulting calcium fluorapatite is even less water-soluble than calcium hydroxyapatite (and thus, „harder“). And since it contains no hydroxyl ions, its solubility is not influenced by acid. Acids don't promote the dissolution of fluoridized enamel. Thus, no cavity formation.

Together with better professional care and increased brushing morale, fluoride toothpastes have led to a precipitous decline in caries rates in the last two decades: According to statistics published in the German news magazine SPIEGEL, in 1983, twelve year olds had almost seven teeth affected by caries. In 2009, in the same age group, it was less than one tooth, on average.

SUMMING IT UP

This positive piece of news is a good conclusion for our list of dental hygiene misconceptions and errors. Compared to times not so very long ago, we certainly do many things right when it comes to caring for our teeth. If this E-book succeeded in opening up your eyes about one or the other brushing misconception: all the better. Here's the take-home sum-up:

- Brush twice daily for two minutes. Use a short-headed toothbrush. Brush gently and thoroughly
- Go easy on the „Whitening“ toothpaste
- Don't brush right after meals
- Floss!
- Limit soft drinks and juice
- Don't let yourself be misled by the anti-fluoride fear mongering: Fluoride prevents caries. Period.