Table of Contents

Chapter 1

Why Do We Smile?

"The mind that opens to a new idea,
never returns to its original size".
Albert Einstein

Dentistry has an amazing array of clinical tools and techniques at our disposal. We can solve so many problems with our skills. However, as much as *we* love all of that, we should remember this: people don't want dentistry. They have better things to do in life than sit in our chairs and spend money with us. When asked what they *do* want, most people want to be healthy and to be able to chew without pain. They also, even if they can't articulate it, want to be able to smile. Many people have a genuine fear of losing their teeth and having to wear dentures. Others have anxiety over the tiniest detail in their smile. In short, people are *different*, but the power of a smile is *universal*.

When I finished my Master's in Science (MSc) in Restorative and Esthetic Dentistry, I was filled with facts, figures and clinical techniques about how to "do" dentistry, but I found myself asking questions about what lies behind esthetics. I have always believed that there is beauty in nature, and in authenticity, and I have a natural wariness of dictating that beauty is something that can be defined by mathematics or "sameness." I began to wonder why. Why should central incisors be exact replicas of each other? Why is it pleasing to our eyes when symmetry exists? I understood that as humans, we make judgments about each other based on appearance, and the smile is part of that, but I wanted to know more.

My research took me into the worlds of psychology, art and esthetics, and even social anthropology. The ideas that I found there fascinate me to this day and are being reinforced by neurobiologists and studies of social behavior as we learn more and more about what it means to be human. This may feel like a long journey away from clinical dentistry, but I believe it is at the very core of becoming a better communicator and a better smile designer.

I discovered the work of Karl Grammer, a professor of Evolutionary Anthropology in Vienna, Austria. He published an article in 1994 in the *Journal of Comparative Psychology* titled "Human (*Homo sapiens*) Facial Attractiveness and Sexual Selection: The Role of Symmetry and Averageness" (Grammer and Thornhill 1994) where he showed that facial symmetry has an influence on facial attractiveness. He has extensively studied and published on the biological basis for attractiveness.

Another study by Fink and Neave in the *International Journal of Cosmetic Science* in 2005 builds on Karl Grammer's work. In their article "The Biology of Facial Beauty" (Fink and Neave 2005), a face of a woman from a white ethnic background is gradually morphed into being of African descent and then of Japanese descent and back to where it started. In Karl Grammer's original work, they showed faces of different ethnicities to people from remote places across the globe and found that while there were cultural differences in beauty standards, there were also similarities based on biological rules, a universal guideline for attractiveness across all cultures.

Fink and Neave concluded: ***"It was once widely believed that standards of beauty were arbitrarily variable. Recent research suggests, however, that people's views of facial attractiveness are remarkably consistent, regardless of race, nationality or age. Facial characteristics are known to influence human attractiveness judgments, and evolutionary psychologists suggest that these characteristics all pertain to health, leading to the conclusion that humans have evolved to view certain bodily features as attractive because the features were displayed by healthy others."***

In evolutionary terms, *attractiveness* and *symmetry* are linked to *health*. Therefore, if we are looking for a mate, a tendency toward symmetry and "averageness" is a biological signal of health and therefore a good prospect as a mate. This makes sense when we think about a healthy smile and a diseased smile. A healthy smile tends to be more beautiful than an un-

healthy one, even if it is not perfect in terms of mathematics. Often, if we return our patients to health, then improved appearance is an added bonus even if it was not the primary intention.

When considering faces, in evolutionary terms, symmetry is a good indication of health. Asymmetry may indicate parasitic infection or disease and not be a good choice as a mate. There are, it seems, biological reasons behind our choices, which affect our sense of beauty or attractiveness.

Of course, it isn't quite as simple as that. There is the definition of healthy to be considered and indeed the perception of health may not be the same as actual health. Whiter teeth, for example, must be a projection of youth and health. I looked further into this and discovered some answers in an unusual place—the writings of Harry Beckwitt, an author on service culture and marketing. In his book *Unthinking—The Surprising Forces Behind What We Buy*, he says "our love of beauty is deep in our bones" and "we see spotless and think healthy and what appears healthy appears beautiful to us."

Biology is part of the puzzle. We have a sense of what a healthy individual looks like and a tendency to assign other healthy characteristics to accompany that.

The art world came next in my investigations, and I know I have only scratched the surface of what can be discovered by reading the depth of study and theories about esthetics that have been undertaken since the ancient Greeks and beyond. My son, Hamish, is currently studying fine art. Art did not feature in my own learning and upbringing, and his interest and passion for the subject has pulled me into a world which, of course, has many corollaries with smile design and esthetic dentistry. We may have imagined that smiles were not often featured in art of times past because of the poor state of dental health. In fact, as dental health was so commonly poor, it was not a consideration for attractiveness.

From *The Serious and the Smirk—the Smile in Portraiture* by Nicholas Jeeves: ***"Nonetheless, both painters and sitters did have a number of good reasons for being disinclined to encourage the smile. The primary reason is as obvious as it is overlooked: it is hard to hold and maintain a smile. In the few examples we have of broad smiles in formal portraiture, the effect is often not particularly pleasing, and this is something we can easily experience today. When a camera is produced and we are asked to smile, we perform gamely. But should the process take too long, it takes only a fraction of a moment for our smiles to turn into uncomfortable grimaces. What was voluntary a moment ago immediately becomes intolerable. A smile is like a blush—it is a response, not an expression per se, and so it can neither be easily maintained nor easily recorded."***

Indeed, smiles in early portraits were considered to be associated with drunkenness and unseemliness, particularly among the ranks of the upper classes. It was not until photography became mainstream that the fleeting capture of expression could include the unself-conscious and authentic expression of a full smile.

Even in the earliest days of photography, a photograph was considered to be an important documentation of a moment in time. Mark Twain, a contemporary of Abraham Lincoln's, was firm on the matter in a letter to the Sacramento Daily Union: *"A photograph is a most important document, and there is nothing more damning to go down to posterity than a silly, foolish smile caught and fixed forever."*

Nicholas Jeeves also states: ***"Nowadays each of us is recorded across hundreds, or thousands of images, and many of us are smiling broadly. Collected, they represent us accurately in all our moods and modes, so we no longer have to worry about being defined by one picture. Indeed, unlike Abraham Lincoln, modern US presidents try to ensure that a number of images are available that will capture the gamut of their emotional range, from troubled solemnity to enthusiastic joy. The same goes for the royal families, recorded in either carefree, knockabout moments, or in stately focus. In the 21st century these figures must be all things to all people, and all occasions."***

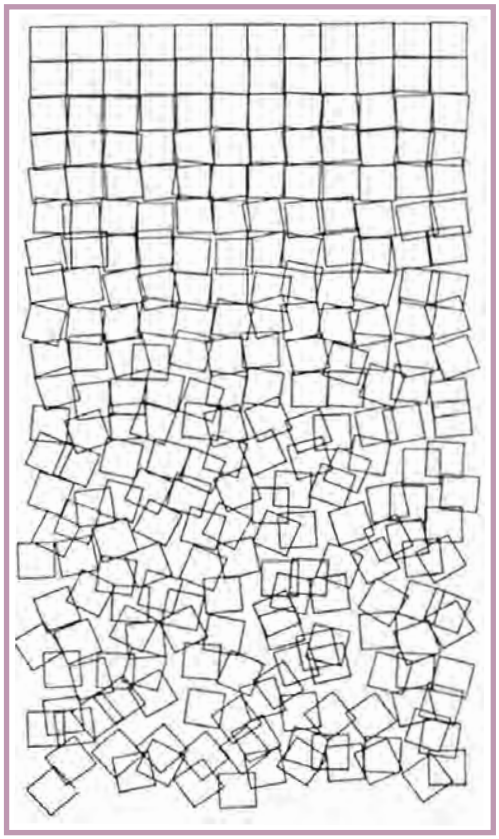
A walk through the National Portrait Museum in London is the perfect illustration of this transition. In the Portrait of Diana, Princess of Wales 1981 by Lord Snowdon, the princess breaks with the royal family tradition and is captured in photography with a beautiful smile.

It seems that since a smile is a dynamic expression, a reaction, we feel uncomfortable when we capture a stage of it in a painting. We find it difficult to read the early stages of a smile without seeing the continuity or context. Many such slight smiles captured are seen as smirks and we wonder as to the nature of their origin. The Mona Lisa, for example, is perhaps the most studied and commented-on expression of all time.

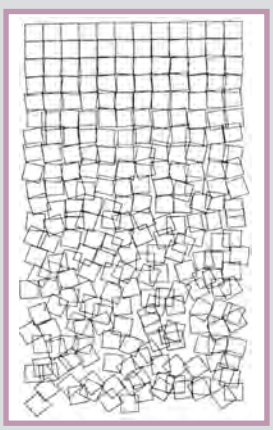
Moving past the complex reasons for the lack of smile design in the history of art world, I was still on the quest to answer the question: *"Why do central incisors look better if they are symmetrical?"* Why is this the first rule we learn in smile design composition? We all know that complete symmetry looks unnatural and if we are serious about creating natural, beautiful smiles, then *harmony* is the key, not complete symmetry.

From the art world, I found a paper on Schotter/gravel stones (Georg Nees 2005). Schotter or gravel stones is a computer-generated illustration resembling blocks of stone. At the top of the image the blocks are regular and as we move down the page they start to tumble and fall. Take a few moments to look at the first image on the facing page.

In the study, they tracked the eye movements of individuals looking at the image; the results revealed that the eyes of the individuals tended to linger about one-third of the way down the image where there is a sense of movement and fluidity but before the sense of pattern and order is lost completely.



The researchers deduced that for our visual perception, complete symmetry and order is *boring,* rigid and uninteresting. And equally, complete chaos is unsettling. We have a tendency to look for patterns and meaning and to prefer a semblance of order but with something interesting to view, some level of *dynamic expression.*

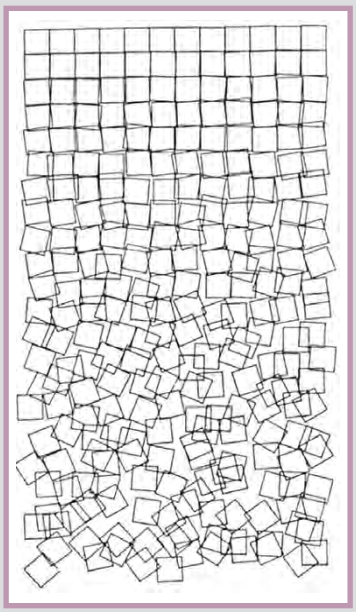


UNINTERESTING

OUR EYES LINGER HERE WHERE THE FLUIDITY IS BEGINNING

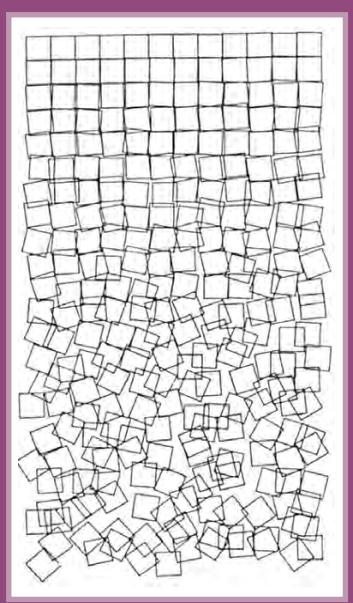
TOO CHAOTIC

My conclusions from this research are that symmetry indicates health, and as we have a biological bias toward seeking out health, symmetry becomes an influencing factor in our judgment of what is esthetically pleasing. However, complete symmetry is boring. As humans, we also look for connection, and we have an esthetic tendency to look for interest and patterns. Too much deviation from symmetry creates visual tension, which is an idea I will link to smile design later in the book. Too much chaos in a smile, then, is unattractive and signals disease to our biological brains, which then computes to a list of other negative assumptions and judgments.



SYMMETRY	ASYMMETRY
Rest	Motion
Binding	Loosening
Order	Arbitrariness
Law	Accident
Formal rigidity	Life, play
Constraint	Freedom
Boredom	Interest
Stillness	Chaos
Monotony	Surprise
Fixity	Detachment
Stasis	Flux
Simplicity	Complexity

Symmetry, therefore, becomes the keystone on which asymmetry can be built and manipulated. I have heard it described this way in terms of smile design—central incisors should be identical twins, canines should be siblings, and lateral incisors can be cousins. In other words, for beautiful smiles, the symmetry of the curve of the smile, the depth of buccal corridors and the frame of the lips gives us our foundation. The lateral incisors can be the dancers on the stage, which brings it to life.



SYMMETRY

CHAOS

The last piece of this puzzle, for me, is to take a step further back and think, *Why does it matter if I smile or don't smile?* If we move past the evolutionary, biological need to find a mate and reproduce, why does a smile remain an important part of how others perceive us in social interaction?

This comes back once again to our evolution as social beings. We are hard wired to belong to our social groups. Human beings, in evolutionary terms, did not survive alone. We need community for safety, food, shelter, all of the basic levels of Maslow's hierarchy of needs (Maslow 1948). Those needs (food, water, warmth and safety, followed by love and belonging) require us to live in communities and to be part of a group. We are social beings.

The health aspect will apply here. If we are not perceived as healthy, we can imagine that we would not be welcomed as part of the group. Think of the most confident person you know, not confident in an arrogant, dominating ego-filled manner, but in a warm, yet self-assured way. Let's add in charisma. People are sometimes described as having a magnetic personality. If you think about someone you know who could be described as such, or someone in the public eye who demonstrates those qualities, what about their body language springs to mind?

I'm thinking about George Clooney as an example, with his confidence, upright posture, excellent eye contact, open arm position and stance, and that smile. Confident and charismatic people tend to smile. The smile may not be perfect but looks healthy and goes with the overall persona. It does not detract; it harmonizes. It puts us at ease, communicating authenticity.

You may have seen the images on social media where celebrities have had their teeth digitally removed or damaged and the effect is Leonardo di Caprio with no teeth or Halle Berry completely edentulous. However, while these images make the point that teeth are required for the individual to look attractive, this is not the complete story. **In real life, when an individual perceives that his or her smile is not going to be seen in a positive light, there is a defense mechanism that kicks in as a form of self-protection.** An individual will teach themselves not to smile fully and may even stop smiling with lips apart or even self-consciously bring their hand up to cover their smile.

Thinking back to the muscles of facial expression that we learn about in dental school, a smile is primarily actioned by the seventh cranial nerve or the facial nerve innervating the zygomaticus major muscle. This muscle runs from the zygomatic arch to the corners of the mouth and initiates a smile. However, a French neurologist in the mid-nineteenth century identified two types of smile—the addition of the orbicularis oculi around the eye is known as the Duchenne Smile. This smile is perceived in dynamic smiling and is also called a genuine expression of emotion. When the orbicularis oculi is not involved, the smile can be perceived as disingenuous or even fake.

It follows that if an individual is feeling self-conscious about their smile, they will train their zygomaticus major muscle not to fully engage and not to lift the lips away from their teeth. By default, the orbicularis oris muscles will not kick in, and consequently, the *perception* other human beings have is that this is not a genuine smile. Other judgments may therefore be applied—, such as this person is not happy, they don't like me, or they are saying one thing and their smile says something else.

As humans, we are neurobiologically wired to be storytellers. Just as we look for pattern and order visually, our subconscious mind looks for patterns and signals in body language. We have a tendency to jump to conclusions and make up stories. The person may be guarding their smile because they are feeling self-conscious and vulnerable for fear that we make judgments about their health and social status, but as a result of not engaging the full, authentic Duchenne smile, we instead make other judgments that are complete assumptions and most likely false.

A study from the Universities of Sheffield and Guy's, King's and St. Thomas's in London (Newton, Prabhu et al. 2003) took images of people and digitally altered only the smile. These images were shown to members of the public who were asked to rate the individuals in terms of their happiness, trustworthiness, likeability, tendency to criminal behavior, and so forth. As we would expect, the images with the better teeth ranked higher in terms of friendliness, and likelihood to earn more and have more friends, while the images with bad teeth ranked higher on likely to be in debt, untrustworthy, more likely to be sad, and so on. Although these results make sense when we consider our predilection for health, it is quite stunning to think how far our storytelling minds will go in making these snap judgments.

And these pictures were still Duchenne smiling—they were showing their unpleasant teeth. If we have an unpleasant smile, it seems our intuition kicks in and protects us from these judgments—we hide or change our smile—but unfortunately the ungenuine smile then leads to another set of judgments, assumptions and storytelling.

A smile is an expression of joy. As humans, joy is linked to a feeling of safety, belonging and purpose.

This is why our profession is so important. Health first, of course, and always, but beyond that we can influence the ability of our patients to smile with freedom, without restraint, and thus be accepted and correctly perceived by those around them for genuine freedom of expression.

I will discuss more about the dynamic versus static smile in later chapters, but it is important to emphasize that a smile is a means of expression. It is not a static position other than when captured in still photography. Expression is a social tool, both verbal and nonverbal, that is essential for us as humans to communicate, relate to each other and integrate into our communities. Restriction of expression can lead to a lack of self-esteem as well as other psychological issues.

Further Reading

- David Brooks, *The Social Animal*, Short Books Ltd., 2012.
- Harry Beckwith, *Unthinking*, Orion Business Books, 1999.
- Robert Sapolsky, *Behave—The Biology of Humans at Our Best and Worst*, Vintage, 2018.