

Summary Notes, Robert Shorey, DDS Clinical Photography

Name _____ CE Units _____ Code _____

Are you using clinical photography in your dental office? Here some facts why you should.

Dentists should use clinical photography for several important reasons related to patient care, communication, and treatment planning. Here's a breakdown of the key points from your list:

- 1. Most dental conditions are chronic:** Chronic conditions often develop over time and may not have immediate symptoms. Clinical photography allows the dentist to document the progression of the condition and track changes over time, which is especially important for conditions like gum disease, tooth wear, and occlusal problems. This visual record can help justify treatment decisions and demonstrate the need for intervention.
- 2. Most dental conditions do not have consistent pain:** Many dental problems, like cavities, gum disease, or misalignment, may not cause immediate pain or discomfort, making it difficult for patients to recognize the severity of the issue. Clinical photographs provide a visual representation of the problem that helps patients understand what's going on in their mouths, even if they aren't feeling pain. This can encourage patients to seek treatment earlier.
- 3. Patients can hide their oral condition from others:** A significant number of dental problems, such as cracked teeth, gum recession, or internal tooth damage, are hidden from plain sight. Patients may be unaware of these conditions or may not realize their severity. Clinical photography allows the dentist to show these issues clearly, providing tangible evidence of the need for treatment.
- 4. Most patients do not see what we see:** Dentists have the knowledge and training to recognize subtle signs of dental problems that patients often can't detect. For example, early stages of tooth decay, gum recession, or dental misalignment may not be visible to the untrained eye. Clinical photographs offer a clear, visual explanation of these issues, bridging the gap between what the dentist sees and what the patient understands.
- 5. Most patients think they don't want our services:** Many patients have misconceptions about their dental health or may be apprehensive about treatment. Clinical photography helps patients visualize their dental issues and often leads to a higher level of understanding and trust. Seeing their conditions documented in photos can motivate patients to accept necessary treatments that they might otherwise have been hesitant to pursue.

In summary, clinical photography is a powerful tool that enhances communication, allows for better documentation of conditions, and aids in educating patients about their oral health. It also plays a crucial role in motivating patients to take the necessary steps to address their dental concerns.

Human beings are intrinsically wired to process and internalize images, making visual communication an extraordinarily powerful tool. Our physiology is deeply connected both cognitively and emotionally to what we see, with sight being one of the most immediate and impactful senses. In fact, the human brain processes images an astounding 60,000 times faster than text—showing just how much more efficiently we absorb visual information.

Speech, by contrast, is a linear process limited by the constraints of short-term memory, which can hold only about 7 bits of information, give or take two. But when it comes to vision, the experience is far more immediate and integrated. Visual information doesn't just pass through our minds; it gets "imprinted" directly into long-term memory. This imprinting process is a fundamental part of how we encode, store, and recall information—making visuals not just a tool for communication, but a powerful anchor for lasting memory.

Here's a breakdown of each of the reasons for taking photos that you've mentioned:

1. Communication Efficiency

- Photos can convey complex information more quickly and clearly than words. A single image can explain concepts, ideas, or situations that might take several sentences to describe. This is particularly helpful in fields like medicine, journalism, or design, where visual clarity is paramount.

2. Personal Emotional Connection to the Image

- People often take photos to capture moments that are meaningful to them, whether for personal reflection or as a way to preserve emotional connections to people, places, or events. These images can serve as visual reminders of a particular time or experience, evoking emotions when revisited.

3. Documentation Record/Chronicling

- Photography serves as a tool for documentation, helping to chronicle events, changes, and developments over time. This is especially useful in fields like history, research, or personal life. For example, documenting growth (e.g., a child's progress) or a project (e.g., renovations) is easier with photos that serve as records.

4. Quantitative Analysis of Clinical Findings and Self-Assessment of Results

- In clinical settings, photos provide a way to objectively document physical changes, symptoms, or progress. This visual data can be useful in tracking improvements, comparing pre- and post-treatment conditions, or evaluating the effectiveness of interventions. It can also be helpful in creating a more accurate clinical history.

5. Co-Discovery

- Sometimes photos are taken to explore and share discoveries with others. This is common in scientific research, art, or even personal projects. Capturing a moment or an object that was previously unseen or unnoticed allows individuals or groups to engage with it in new ways, often spurring further exploration.

6. Indelibility – It is Difficult to Un-See Something

- A photo can capture something that makes an impression so lasting that it can't be easily forgotten. Once an image is captured, it preserves that moment in time with great fidelity, and it becomes hard to "unsee" it. This could relate to both positive memories and challenging or traumatic experiences, but in either case, the impact remains indelible.

Each of these reasons underscores how versatile and powerful photography can be as a tool for communication, record-keeping, and personal expression. Would you like to delve deeper into any of these points or explore how they relate to a particular field or interest?

Digital Camera Fundamentals:

A pixel, short for "picture element," is the smallest unit of programmable color on a display or image, forming an electronic mosaic. The larger the sensor, the more light it can capture, resulting in more detail. For example, a 24MP camera with a full-frame sensor (35x24mm) provides **more detail and vibrancy than one with a smaller APS-C sensor** (22.5x15mm), or an iPhone's even smaller sensor (6x4mm).

Since the iPhone 13 Pro, pixel quality has been clinically capable. The iPhone 16 Pro features three cameras:

- **48MP Main Camera:** 26mm focal length, $f/1.6$ aperture.
- **12MP Telephoto:** 52mm focal length, $f/1.6$ aperture.
- **12MP Ultra Wide:** 13mm focal length, $f/2.2$ aperture, 120° field of view.

Smartphones **are limited by lens quality and sensor size**, relying on software for light control. In contrast, SLRs provide more manual control over light:

Sophisticated Cameras still have greater light control than the current generations of smartphones — they require more knowledge of photography fundamentals than a smartphone as well. Here are basic SLR camera elements.

1. Control of Light (Key Elements: Aperture, Shutter Speed, ISO)

- **Aperture (f-stop):** This controls how much light enters the camera through the lens. The larger the aperture (smaller f-number), the more light that comes through. A smaller aperture (larger f-number, like $f/16$) reduces the amount of light and increases depth of field (the range of the image that is in focus).
- **Shutter Speed:** This controls how long the camera's shutter remains open to let light hit the sensor. Faster shutter speeds (like $1/1000$) freeze motion, while slower speeds (like $1/30$) can blur movement, creating a sense of motion or letting in more light.
- **ISO:** This controls the sensitivity of the sensor to light. Higher ISO settings (like ISO 1600 or above) make the sensor more sensitive to light, allowing for faster shutter speeds in low-light conditions, but they can also introduce noise (grain) into the image. Lower ISO (like 100) produces cleaner images but requires more light.

2. Sensor Speed (ISO Sensitivity)

- The sensitivity of the sensor is essentially the ISO setting you're using. A higher ISO allows for more light to be captured in low-light situations, but it also tends to introduce more digital noise into the image.
- **ISO in Dental Photography:** When capturing details like teeth, you typically want to use the lowest ISO that still allows for a well-exposed image. This reduces noise and retains fine detail, especially important in clinical or dental settings.

3. Lens Control (Distance, Macro Settings)

- **Distance from Object:** The lens focal length and physical distance to the object play a major role in framing and detail. For dental photography, this often means getting very close to the subject (the teeth) while maintaining focus.
- **Macro Mode ("Flower" symbol):** The "flower" symbol on a camera indicates the macro setting, which is designed for close-up photography. In macro mode, the lens focuses on small, detailed subjects from a very short distance—ideal for capturing dental features.
- **Fixed Lens and Adapters:** Many clinical cameras, especially in dental photography, come with fixed lenses (non-interchangeable). However, lens adapters or extension tubes can be added to allow for greater magnification and closer focusing.
- An SLR camera has the advantage of being able to change lenses and increase the quality of glass for the best detail during macro photography.

4. Specialized Dental Equipment

- **Dental Camera Features:** Many clinical or prosumer dental cameras have simplified settings to make photography easier for practitioners, but may sacrifice image quality for ease of use.
- **Aperture Control:** Some dental cameras may have specialized controls, such as limiting the aperture to specific settings (like f16) to ensure proper depth of field and consistent focus for clinical photography.
- **Presets (C1, C2):** These are custom settings on a camera that allow you to store frequently used configurations for specific types of photography, such as macro shots of teeth or intraoral images.
- An SLR camera can usually achieve the best details of images because they are able to use lenses with f-stops to 32 achieving a good depth of field. Depth of field gives the ultimate detail of the image at both the front and back of the image.

5. Image Quality vs. Simplicity

- **Prosumer Cameras:** These cameras are designed for semi-professional use and may offer a balance of ease of use and image quality. While they're good for general dental photography, they may not produce the highest-quality images compared to high-end cameras with more advanced control over aperture, shutter speed, and ISO.
- **Clinical Cameras:** These are often simplified to make them easier for dentists and hygienists to use without needing to adjust complex settings. However, this simplification might result in lower image quality, especially in terms of color accuracy, resolution, and detail.

- SLR cameras require specialty lenses as well as flash units to drive light into the oral cavity. SLRs are usually larger and heavier than smartphones or prosumer cameras.

Key Points for Dental Photography:

- **Depth of Field:** This is crucial in dental photography, especially for capturing the entire area of interest (e.g., teeth, gums) in focus. Using a smaller aperture (like f16) helps increase the depth of field, ensuring more of the subject is sharp.
- **Lighting:** Adequate and consistent lighting is critical. In dental photography, ring flashes or off-camera lighting are often used to avoid harsh shadows and ensure even illumination of the subject.

In summary, achieving good clinical or dental photography involves understanding how to control light through aperture, shutter speed, and ISO, along with using the right lenses and settings for close-up shots. Flash units and specialized equipment and camera settings help ensure that you capture the fine details needed for clinical records.