

RELIABILITY OF DIGITAL IMAGING SYSTEMS IN ORTHODONTICS

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Imaging is an important tool in orthodontics. We use it to record and measure the size and form of the craniofacial structures, as these elements are essential in diagnosing and treatment planning our cases. Today we can run a practice almost paper free by using electronic patient records instead of paper records. Along with the advantages of digital technology, however, there are downsides, and orthodontists must be aware of them before jumping into the world of digital imaging.

Digital imaging is widely employed in medicine. In the field of orthodontics, digital imaging is involved in:

- digital photography
- digital radiographs (with/without software on-screen digitizing)
- treatment prediction software
- 3D study models
- turning existing paper records into digital records

While digital imaging has many advantages, it also has complex issues such as picture quality, color balance and contrast, sharpness and file size that are problematic. Despite the growing use of digital images, there have been few attempts to standardize digital photography.

Previous research has shown the importance of color when digital images are used for diagnosis and treatment planning. In some areas of medicine, *e.g.* dermatology, plastic surgery and forensics, a number of critical medical decisions are based on morphological evidence observed in various color images. Accurate recording and reproduction of colors is essential; color inconsistencies may lead to erroneous diagnoses. In orthodontics, poor color reproduction of digitized images does not really affect diagnosis or treatment planning, but color consistency of digital photographs still should be a priority in the protocol for orthodontic records (Fig. 1).

Another area that is inadequately standardized is how digital photos are obtained. Incorrect positioning of the camera in terms of distance and height of the camera can lead to severe distortions. Classification of certain orthodontic problems can be altered by a photograph taken from a different angle. The intraoral photographs in Figure 2 are of the same patient. The patient's deep bite can be increased or decreased depending on the angulation of the photo. Figure 3 demonstrates that altering the parallax of the camera can make the patient's left buccal segment appear more Class I.

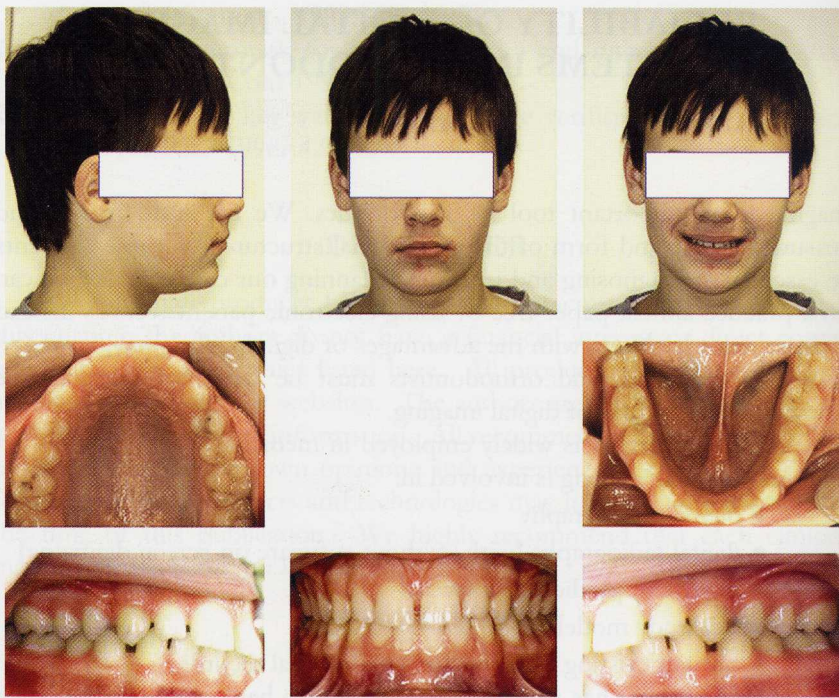


Figure 1. Color inconsistencies are often seen in composites of digital pictures.

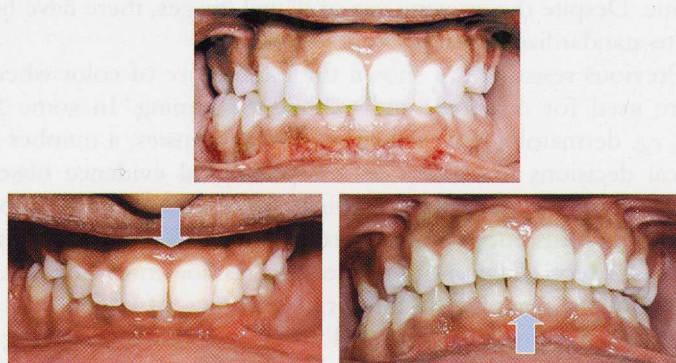


Figure 2. Altering the angulation of the camera changes the depth of the patient's bite.

Digital images are more efficient and inexpensive to store than conventional photographs, but most software applications limit the file size. Therefore, in order for us to store digital images, we must decrease the file size. It is important to consider the problems associated with small file size, because compression may result in distortion of the images.

