Oral Health Case Reports

Case Report

Utilization of Dental Photography for Treatment Planning and Developing Patient Consultations

Ron Goodlin*

Smiles Dental, Yonge Street, Suite 6, Aurora, ON L4G 1L8, Canada

Case Study

Digital Dental Photography is the new standard of care [1]. The internet generation is looking for more from their service providers and dental practitioners are looking for ways to increase productivity by way of increasing treatment acceptance and being more efficient in providing treatment. Patients and practitioners benefit from treatment that is faster, easier, and more predictable. Utilization of photography to assist in the diagnosis of dental conditions, treatment planning and creating a patient consultation that is organized and user friendly for both the dental team and easy to understand by our patients with the end result of garnering informed consent through improved patient education, discussion, and understanding of their dental condition including presentation of the treatment options that are available to them. Often, simply by marking the photograph by circling the areas of concern (Figures 1 and 2) help create a much more comprehensive approach to treatment planning. This system also provides a clinical record of what has been presented and discussed with the patient to be kept for future reference if ever required.

Photographic assisted diagnosis and treatment planning by applying the principles of anthropometrics smile design and simple observation along with patient interaction, are the keys to this very simple system [2]. It is necessary however for the dental practitioner to learn some

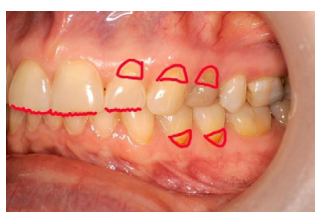**Figure 1:** Incisal edge position determination.

Figure 2: Circling areas of concern on photo.

Figure 3: Lips at rest position.

Figure 4: Smile view.

Figure 5: R retracted 1:2.

simple and easy imaging techniques using readily available imaging software programs such as photoshop elements (Adobe Systems).

Practice management systems, allow the dental team to repeat various procedures with predictability and efficiency. Every new patient undergoes the same systematic approach to the new patient exam from the moment they enter the door and the way they are greeted by the administrative team, the office tour, introduction to the staff and dentist, office philosophy explanations. Patient interview regarding the patient concerns and reason they have chosen to seek dental care, and culminating in the new patient exam process.

Diagnostic records are taken which include comprehensive cancer examination, TMD evaluation, occlusal analysis, periodontal exam and pocket measurements, charting, radiographs, and study models. Finally, a series of dental photographs are taken [3-5] which will include facial 1:10, profile 1:10, (not shown) lips at rest 1:2. Smile 1:2, (Figures 3 and 4) retracted anterior left and right lateral 1:2, (Figures 5-7) maxillary and mandibular occlusal views 1:2 and close-up retracted maxillary anterior right and left lateral views 1:1, (Figures 8-10) and a lower anterior close up view is taken 1:1 (Figure 11).

The images are downloaded and saved to the patient chart, and then

*Corresponding authors: Ron Goodlin, Smiles Dental, 15213 Yonge Street, Suite 6, Aurora, ON L4G 1L8, Canada, Tel: (604)433-7444; E-mail: ron@smiledental.ca

Figure 6: Retracted 1:2.

Figure 7: L retracted 1:2.

Figure 8: R retracted 1:1.

Figure 9: Retracted 1:1.

Figure 10: L retracted 1:1.

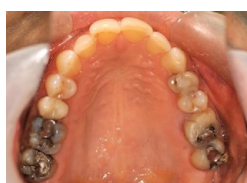**Figure 11**: lower anterior 1:1.

Figure 12: Max Occlusal.

Figure 13: Mdb Occlusal.

Figure 14: Max Occlusal flipped and quadrant 1 selected.

Figure 15: Max quadrant 1 saved.

Figure 16: Quadrant 1.

Figure 17: Quadrant 2.

Figure 18: Quadrant 3.

Figure 19: Quadrant 4.

Figure 20: Quadrant template. Note the conditions are written on the left panel indicating areas of concern with a brief description in layman's terms. The right panel gives the treatment options with the possible options in bold and the recommended treatment with an apteryx. The lower photo is the retracted view of that side as an additional view and for patient reference. After review of the patient booklet, the practitioner and patient will determine the priority of treatment for that area and indicate that on the bottom left.

Figure 21: Anterior retracted view

Figure 22: Imaging.

Figure 23: Digital design.

opened in the imaging software program (Figures 12-15). Here, images are cropped, and occlusal images are flipped vertically as the original image is a mirrored view. The practitioner will then continue with global edits using exposure levels, contrast, saturation, and sharpening are applied to optimize the images. Finally, the occlusal images are opened, each quadrant is selected and duplicated to a new image (select with Rectangular marquis tool, Ctl+C, Ctl+N, Enter, Ctl+V now the selected quadrant will appear as a new file).

Finally, fine tune the contrast, sharpening and exposure to maximize the diagnostic quality. These images are then saved as Quadrant 1, (Max R) Quad 2, (Max L) Quad 3 (Mdb L) and Quad 4 (Mdb R) (Figures 16-19). These images are then saved in the patient folder.

Starting with each quadrant, Utilizing a pre made and saved template, images are dragged into the template and with the added information from the clinical exam radiographs and the photograph, clinical conditions and concerns are noted on the left panel relating to each tooth in the quadrant [4]. On the right side panel the treatment options are listed: Filling with composite, filling with amalgam, inlay or onlay, crown or no treatment (monitor). Bold all the options that are appropriate for each tooth and then place an asterix beside the most ideal treatment (Figures 20).

Repeat the process for each of the 4 quadrants and repeat the process for the upper and lower anterior teeth.

For the anterior teeth and cosmetic concerns, the practitioner is able to utilize some simple digital imaging techniques to create a digital design for the possible cosmetic improvements. Utilizing the dodge (midtones) tool at 25% you can lighten the teeth to simulate Zoom Whitening (Philips corp), the clone tool can eliminate areas of stain and decay. The rectangular marquis tool can be used to select and paste a tooth then make it longer or change its position, or the liquefy tool to move tooth position, and close diastemas (Figures 21-23).

The practitioner can then save this digital design and use this in a before and after template to show the patient an "idea" of what we would try to accomplish for them from a cosmetic standpoint.

Figure 24: Part one of the booklet is an introduction and welcome to the practice, a directory of staff with photos, names and position, and a listing of the patients concerns regarding their oral health condition and any fears or concerns about dental treatment. This is important so the patient knows the Dental team is listening and addressing their concerns.

Figure 25: Part two of the booklet promotes a discussion about the connection between oral and systemic health, an information sheet describing this connection, and then a risk assessment of the patient in the areas of caries, periodontal disease, TMD and overall systemic health.
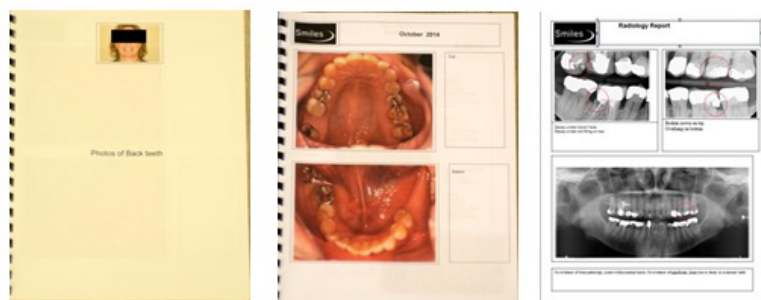

Figure 26: Part three of the concentrates on the overall condition of the back teeth, arch form, missing teeth including a radiographic review to show patients decay or disease processes and promotes a discussion regarding flossing and interproximal decay, and how restorations do not last forever.
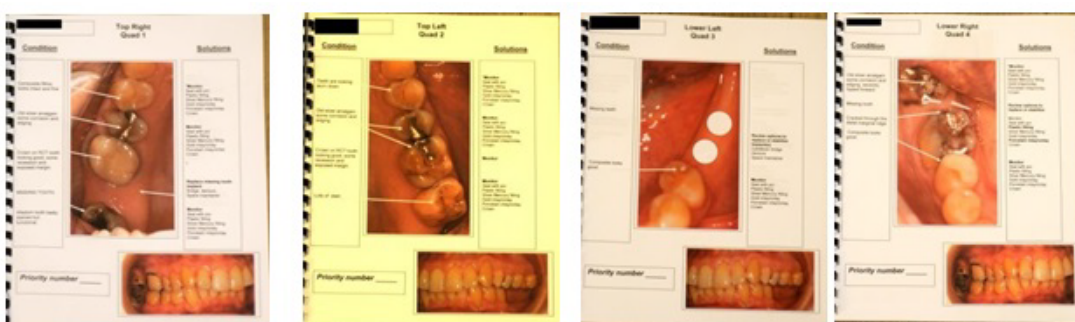

Figure 27: Part four of the booklet concentrates on each quadrant of the back teeth for specific and detailed analysis of the tooth conditions and treatment options.
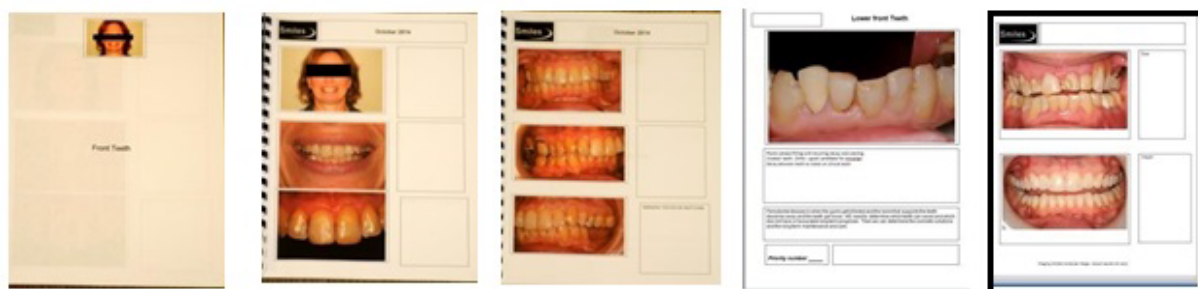
Figure 28: Part five of the booklet concentrates on the anterior teeth for specific and detailed analysis of the tooth conditions, cosmetics and the imaging before and after to show the patient what cosmetic treatments can be undertaken to reach the digital smile design.

Figure 29: Part six of the booklet outlines the treatment options that are available. The treatment plan sheet also has the patient concerns listed so they are sure the dental team is addressing the areas of concern they indicated in the initial discussions. Additional pertinent informational sheets can be included as references in the back of the booklet outlining treatment procedures such as crowns, onlays, implants etc.

The templates are printed and bounded in a booklet for the patient consultation where each page is reviewed in sequence (Figures 24 and 25). During the process, the patient is encouraged to circle areas of decay or problems they see on the template pages in the booklet during the consultation process so they are actively involved in the discussion and treatment planning process. This co diagnosis technique has the effect of the patent taking ownership of any areas of concern, and they can understand the oral condition without them redirecting these concerns as we frequently hear, "the dentist told me I have 23 cavities" [5].

The template guides the practitioner in the consultation process so nothing is missed in the discussion and the presentation is understandable for the patient without being overwhelming [6-9]. The final page is in the form of a treatment plan complete with the options that were discussed during the consultation appointment.

After all the options are presented, the practitioner and patient will review each template page to create a priority list to determine the treatment sequence. The treatment coordinator will then take over discussing costs, insurance and timing and the patient will then be ready to commit to a treatment plan and schedule that they have had active involvement in determining with the aid of educational materials, provided options, discussions of benefits and risks creating a system of documented informed consent (Figures 26 and 27).

Following completion of treatment, a new set of photographs are taken to show the before and after clinical condition (Figures 28 and 29). These can be used for marketing purposes, teaching and clinical articles, self-evaluation and of course as part of the patient record for future reference and comparison [7,8].

References

1. Canadian Dental Protection (2015) Association conference on Safe Practices Toronto Ontario.

2. Goodlin R (2011) Photographic-assisted diagnosis and treatment planning. Dent Clin North Am 55: 211-227.

3. Goodlin R (1984) The Complete Guide to Intra Oral Photography. Michael Publishing.

4. Goodlin R (2016) Utilization of Templates for Patient Consultations, Journes Dentaire de Quebec.

5. Bader JD, Shugars DA, Bonito AJ (2002) A systematic review of the performance of methods for identifying carious lesions. J Public Health Dent 62: 201-213.

6. Brocklehurst PR, Baker SR, Speight PM (2010) Primary care clinicians and the detection and referral of potentially malignant disorders in the mouth: a summary of the current evidence. Prim Dent Care 17: 65-71.

7. McLaren EA, Terry DA (2001) Photography in dentistry. J Calif Dent Assoc 29 (10): 735-742.

8. Sandler J, Murray A (2001) Digital photography in orthodontics. Journal of Orthodontics 28(3): 197.

9. Griffin JD Jr. (2006) Quality Digital Photography Can Enhance Dental Skills. Contemp Esthetics 10: 2-9.