Easy Digital Photographic Setup in Plastic Surgery: Kid's Studio

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Background: *Having consistent, high-quality clinical photography is a cornerstone of any plastic surgery practice. This requires a convenient, simple and cost-effective setup that is versatile and can be applied to many clinical scenarios. The professional photographic studio setup is the gold standard to which all other photographic methods are compared, but is expensive, cumbersome, and at times, impractical.*
Objective: *The authors introduce the "Kid's studio" method of clinical photography, which produces high-quality clinical photographs with the use of simple, easily available equipment that can be found in most clinics. Then compare quality of photos taken from Kid's studio with photos taken from standard studio setup and the other two techniques commonly used by most plastic surgeons (on-camera flash photography and conventional non-flash photography).*
Material and Method: *Twenty subjects were enrolled (9 males and 11 females). Each subject was photographed in each of the four photographic setups, in six standard positions. For each subject, photos taken in the same posture with each of the different setups were randomly arranged and printed on the same photographic paper. Three evaluators were recruited and asked to rate the quality of the photos, according to all image characteristics (color, brightness & clarity, facial detail, background, shadow, depth of field and overall image quality). The score of each image was marked on the 10-cm visual analog scale, which 0 = worst and 10 = best image quality.*
Results: *Overall quality scores of Kid's studio, flash setup and ordinary setup were 8.98±0.75, 6.8±0.77 and 5.17±1.13, respectively. The mean scores of all image characteristic subcategories (i.e. color, brightness & clarity, background, facial detail, shadow, depth of field) of Kid's studio were highest, followed by flash setup and ordinary setup.*
Conclusion: *The authors introduce the "Kid's studio" method of clinical photography, which produces high-quality clinical photographs with the use of simple, easily available equipment that can be found in most clinics. As compared with other methods of photography such as on-camera flash photography or conventional non-flash photography, the Kid's studio method has been demonstrated to produce consistently higher scores. As such, the authors recommend the implementation of this technique for clinical photography, in order to meet photographic standards outside of photographic studio.*

Keywords: *Kid's studio, Medical photography, Plastic surgery photography, Photography*

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In 1920, Sir Harold Gillies wrote in his book, Plastic Surgery of the Face, "Surgery calls Art to its aid"[1]. Subsequently during World War I, he used high quality photographs as an important adjunct in the treatment of wounded soldiers and sailors. In 1955, at the First International Congress of Plastic Surgery, Gillies stated: "I have been asked to speak about the important advances in plastic surgery. I think that the most important advance is photography[2]".

For more than a half century, photography has been a cornerstone for plastic surgeons for the

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following usage: preoperative planning, visual reference during surgery, evaluation of operative results, publications, presentations and educational purposes. Moreover, patients' photographs are a critical element of the medical record, which may protect plastic surgeons in the case that malpractice legal claims are levied.

Various articles have previously highlighted photographic standards in plastic surgery[3,4]. Advanced skills, complicated instruments and studio setup are required, according to previously published technical photographic guidelines[5,6].

Capturing image in an outpatient room and in the ward often does not fulfill the photographic standard. Despite the fact that standardization is easier with photographic studio setup, the studio setup is expensive and requires a dedicated area. Most of plastic surgeons have difficulties achieving photographic standards[7]. Many plastic surgeons avoid studio setup, due to its impractical nature, either taking photos with an ordinary light environment (without additional light source) or taking photos with camera built-in flash in the examination room.

Our objective is to propose a simple, reproducible, consistent and applicable setup to achieve standardized photography of the face. We developed a method, called "Kid's studio", to simulate the studio conditions as close as possible. Apart from that, we also evaluated the quality of the photos taken with this method, comparing to other three methods commonly used by plastic surgeons worldwide.

Material and Method

The corresponding author (KK) invented an easy setup for facial medical photography, named "Kid's studio". This setup has been used in a daily practice in our department for more than 6 years. This study evaluated quality of photos taken by Kid's studio, comparing to standard studio setup and other two setups commonly used among plastic surgeons (ordinary light and on-camera flash). Photographic detail of each setup is described below.

Kid's studio

Kid's studio is a special combination of low-cost, portable equipment and two observation lamps, which are easy to find in most clinics and hospitals. Equipment includes a compact digital camera, specially created foot template and marking strips placing on the wall to fix the eyes position of the subjects. In our study, we used a Canon S110 camera (Canon Inc., Tokyo, Japan) and 22-watt circular fluorescent observation lamps (RIMSA company, Seregno, Italy). This equipment was set up in an original outpatient department (OPD) room with ordinary overhead fluorescent light, emitting from two 18-watt fluorescent light bulbs attached on the ceiling. The minimum space required for Kid's studio is 1.8x1.6x2.0 meters for length, width and height respectively.

A one-square-meter piece of fabric is strapped on the wall as a background. We recommend using a white or light (18 percent) grey color, non-reflecting material, because it gives the most correct light metering of the subject by most cameras. In the case that the wall of the room is white or light grey, made of non-reflecting material, ones can use it directly as a photographic background.

A specially-created foot template (Fig. 1) is placed 30 cm in front of the background. This template guides the subjects to predetermined positions during photographic shooting. Two observation lamps were placed 75 cm from the center of the foot template with a 45-degree angle, in order to create a balanced cross-lighting and bring out surface texture without creating shadows that are overly harsh. The height of the lamps was adjusted to the same level of the subject's face. Equipment setting and dimensions are shown in Fig. 2.

For facial medical photography, the subjects were carefully prepared. Subjects' hair was pulled off the face and placed behind the ears. Black headband or small clips that hold hair without pulling were supplied. Ornaments, such as earrings and necklaces or eyeglasses, and heavy makeup were removed.

Each subject was asked to stand on the circle in the middle of the template. For the frontal view the

Fig. 1 A specially-created foot template.

subject was told to look at the lens of the camera, while the photographer was holding a camera in the same level as the subject's face. For the basal view, the subject was asked to extend the neck and stare at the marker on the ceiling. For the lateral and oblique views, the subject was asked to turn the whole body, stand up straight with feet stepping on either side of the appropriate radiating line of the foot template. Meanwhile, the subject was also asked to stare straight at the marking strip placing on the wall, in order to control the position of the subject's eyes.

The camera was set to Program mode (P mode), which most of the parameters, such as aperture value and shutter speed, were automatically adjusted. The ISO was set to 500, exposure bias value was neutral and fluorescent white balance was used. For the image file record, the JPEG format with the highest resolution was selected.

The photographer stood at the marking tape placing on the floor at 100 cm from the center circle of the foot template, which is the subject's standing point. After that, the photographer used an optical zoom button to zoom in the subject's face to the point that the acquiring area is fit with the photographic frame. This automatically prevented distortion of the image resulting from wide-angle lens. Before shooting, the photographer checked the tidiness of the subject's face and position. In a lateral position, the photographer ensured a true lateral position by checking on a viewfinder that eyelashes of both sides are superimposed perfectly. Finally, the shutter was released. Series of photographs taken under Kid's studio are shown in Fig. 3.

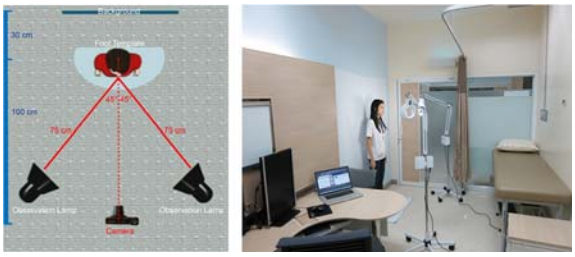

Fig. 2 Kid's studio: (left) diagram of equipment setting and dimensions, (right) real setting in the OPD.

Fig. 3 Series of photographs taken from a subject in six standard positions, using Kid's studio, are shown.

Ordinary setup

Room settings, patient preparation, camera and camera setting were the same as Kid's studio, except both observation lamps were turned off. Therefore, the main lighting is ordinary fluorescent light of the OPD room.

Flash setup

Room settings, patient preparation, camera and camera setting were the same as Kid's studio, except that the observation lamps were turned off and the built-in flash of the camera is activated.

Studio setup

All subjects were brought to a medical photographic studio of the hospital. The protocol of photography adhered to was The Photographic Standards in Plastic Surgery, published by American Society of Plastic Surgeons/Plastic Surgery Education Foundation (ASPS/PSEF)[6]. Standard equipment in the studio consisted of a full-frame DSLR camera-Canon EOS 5D mark II (Canon Inc., Tokyo, Japan), Canon EF 100 macro-lens, wireless external flash trigger, synchronized external flashes and backlight flash. The camera settings were as follows: manual mode (M mode), ISO 100, manually-adjusted white balance, aperture value 11 and exposure time 1/60 second. All images were recorded in a JPEG format with the highest resolution. We applied the same background fabric, foot template, patient preparation and positioning, in order to eliminate recognition bias from the evaluators.

Validation process

Twenty subjects were enrolled (9 males, 11 females). The mean age of subjects was 29.4 years (range 22 to 55). Each subject was photographed in

each of the four photographic setups in the six standard positions. For each subject, photos taken in the same posture with each of the different setups were printed on the same photographic paper, without any modification of the image files. As the standard of reference, photos taken from the studio setup were placed consistently on the left upper quadrant of the page. Photos taken from other three different setups were randomly located on the rest three quadrants of the printing paper. Frontal photographs of a sample subject, taken by four different setups, are shown in Fig. 4.

Three evaluators were recruited. Two are plastic surgeons that are also experienced scientific journal reviewers. The latter is a professional photographer. Each evaluator received the printed images and was asked to independently rate the quality of the photos, according to all image characteristics (color, brightness & clarity, facial detail, background, shadow, depth of field and overall quality). All of the evaluators were blinded from photographic setup used. The score of each image was marked on the 10-cm visual analog scale, which 0 = worst and 10 = best image quality.

Quantitative variables were computed as means and standard deviations. Test difference between two models using t-test and level of statistical significance was set at $p<0.05$. Analyses were carried out using the Stata: Release 12.

Fig. 4 Frontal photographs of a sample subject, taken from four different setups, are shown: (above, left) studio setup, (above, right) ordinary setup, (below, left) flash setup, (below, right) Kid's studio.

Results

Four hundred and eighty images were taken from 20 subjects. Overall quality scores of Kid's studio, flash setup and ordinary setup were 8.98±0.75, 6.8±0.77 and 5.17±1.13, respectively (out of a maximum score of 10). The mean scores of all image characteristic subcategories (i.e. color, brightness & clarity, background, facial detail, shadow, depth of field) of Kid's setup were highest, followed by flash setup and ordinary setup. The differences between score of each setup in all categories were statistically significant ($p<0.001$). Detail of the scores is shown in Fig. 5, 6 and Table 1.

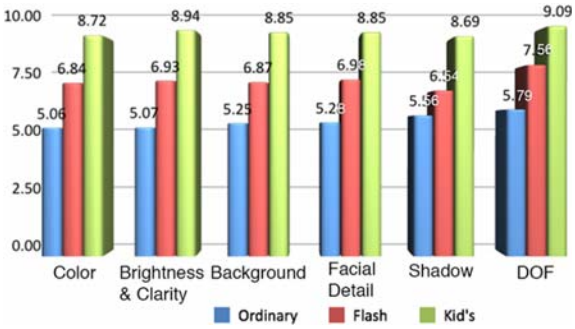

Fig. 5 The mean scores of photographic features comparing between tested methods are shown (DOF = depth of field).

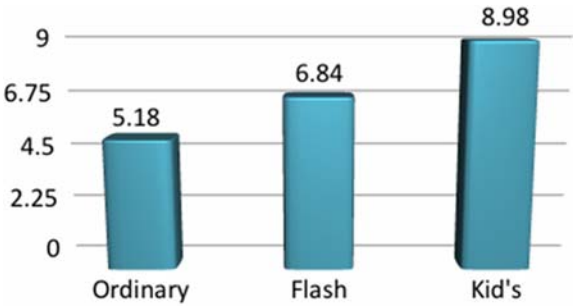

Fig. 6 Mean overall quality scores of photographs taken from three tested setups are shown.

Table 1. Results of three tested methods show that Kid's studio not only provided the best overall quality of photographs, but also gave better all photographic characteristics. Beside Kid's studio, photographs taken with on-camera flash have better quality compare to ones taken from ordinary environment of the OPD

Variables	Ordinary Mean ± SD	Flash Mean ± SD	Kid's Mean ± SD
Color	5.06±1.15	6.84±0.84	8.72±0.90
Brightness	5.07±2.97	6.93±0.86	8.94±0.96
Background	5.25±1.19	6.87±1.08	8.85±0.97
Facial detail	5.28±1.21	6.98±0.82	8.85±0.82
Shadow	5.55±1.48	6.54±1.16	8.69±1.05
Depth of field	5.79±1.52	7.56±0.76	9.09±0.88
Overall quality	5.18±1.14	6.84±0.78	8.98±0.75

Discussion

As mentioned above, our objective is to propose simple, reproducible, consistency and applicable setup to achieve photographic standards of the face. The advantages of Kid's studio include low cost, use of commonly available clinic equipment, convenience (without need to move the patient to dedicated photography room), space saving (does not require dedicated space for photography) and proven photo quality in every aspect by evaluators.

The results reveal that characteristics essential to reliable clinical outcome assessment, including color, brightness, background, contrast, shadow and resolution were significantly different between the paired images in all lighting setups. Dissimilarities in color, brightness, shadow, and contrast may hinder accurate appreciation of image detail. Kid's studio scored the highest overall quality rating followed by flash and ordinary setup.

Three independent evaluators represented potential users (consultant plastic surgeons) and expert (professional photographer). In order to eliminate bias during evaluation of the photos, all evaluators were blinded to the photography setup technique used when rating the various photograph characteristics. The two evaluators who are consultant plastic surgeons and international journal reviewers are especially appropriate in their ability to critically evaluate the various technical aspects of the photographs taken. The other evaluator is a professional photographer who is knowledgeable about the technical aspects of photography and is able to give an expert evaluation.

Having a consistent method of photography is essential for surgeons comparing time series of patients' photographs. There are several variables that affect the quality of digital images captured with a digital camera. These include camera, lens, camera setting, lighting, background, room setup and positioning[5]. Failure to adhere to photographic standards may result in visual misinterpretation.

Good clinical photograph should record a maximum amount of pertinent medical information whilst having minimal distraction (such as image distortion, shadows, etc). Standardization of the camera setting, lighting, background, patient preparation and position will ensure that consistent and reproducible photographs are taken of the same patient regardless of time. This will allow valid comparison of photographs taken of the same patient at different time intervals. Thus, the effect of surgery or procedure is apparently visualized.

The difference of room setup and camera setting produces different images. The wide-angle lens has a tendency to produce distorted images. An example of lens effect is shown is Fig. 7. Additionally, to avoid distracting shadows, lighting is significant. The direction of light source, and the shadows it creates, will affect how the texture and form of the subject will appear. Light from the flash attached to the camera not only produces relatively flat appearance of the subject, but also it creates harsh shadow behind, which can obscure the subject detail and distract attention of the viewer. When the light is coming from one side of the subject, it produces shadows on the opposite side, leading to decrease in detail of the subject under shade. Fig. 8 demonstrates the flattened image with overly harsh shadow created form on-camera flash lighting.

In 2006, ASPS/PSEF published The Photographic Standards in Plastic Surgery[6], a general guideline for plastic surgeons to follow. Summary of photographic standards recommended are as follows: (1) The photograph must be sharp and clear, resulting from proper focus, fast enough shutter speed and steady camera; (2) The depth of field must cover all the facial detail, resulting from proper camera-to-object ratio and not too wide aperture value; (3) Image noise or unwanted spots in the photograph are not obvious, resulting from not too high ISO; (4) Detail of the face should be symmetrically presented and maximized, resulting from proper lighting; (5) There should not be overly harsh shadows in the photograph; (6) Color of skin tones should be natural and close to the real

Fig. 7 Effects of wide- and tele-angle lenses are shown. Both photos were taken from the same subject, same environment, same setting but different focal length. (Left) Wide-angle lens creates distortion of the subject, resulting in wrong dimension of facial detail. (Right) Tele-angle lens gives an image, which represents the reality of the subject.

Fig. 8 Effects of on-camera flash are shown. (Left) The obtained photograph is flattening due to front lighting. (Middle) Harsh shadow is obviously inspected in front of the subject's face. Facial detail on the right side of the face is obscured, caused by mid line structures obstructed the light omitted. (Right) Although holding a camera in the opposite way is able to get rid of the shadow in front of the subject, the flattening effect and harsh shadow on the opposite site are still remain.

subjects' skin, resulting from a proper set white balance; (7) The background should be solid color that contrast well with skin tones; (8) Patient positions should be accurate and reproducible; (9) Hair must be pulled back and the patients' forehead must not be obscured; (10) Distraction including jewelry and make up should be removed. In order to achieve these standards, a proper photographic studio setup is usually required.

In 2010, Sanniec et al[7] randomly evaluated quality of patients' photos uploaded on websites of members of American Society for Aesthetic and Plastic Surgery (ASAPS). They found that none of the included websites were in complete adherence with the evaluated ASPS/PSEF standards. Fifteen percent of the images were out of focus. One of the most common errors found in the study was cast shadow, which resulted from the use of on-camera flash. The result of this study reflects the impracticality of a medical photography using a proper studio setup. Therefore, an easier way to meet medical photographic standards in the OPD is required.

Persichetti et al[8] proposed a method to achieve photographic standards in the OPD, using on-camera flash as a main light source. The article emphasized the correct way of holding camera, in order to avoid harsh shadow appearing on the same side behind the facial detail. In our experience, the proposed method is the best way to photograph patients in the clinic where no other better lighting is available. However, a flash attached to the camera, such as built-in camera flash, hot shoe flash and ring flash, can only give a front lighting. Front lighting creates flat-look photos, which detail and dimension are usually obscured. Thus, a balanced-cross lighting is crucial, in order to meet photographic standards of plastic surgery.

In Kid's studio, we used two fluorescent observational lamps creating a balanced-cross lighting. Due to the development in photography technology, new generation compact cameras provide a more than acceptable image quality. Many problems in the past, such as poor resolution, noise, white balance, have been overcome. Quality of images taken with higher ISO setting is acceptable compare to an older technology. Therefore users are able to get good quality photos in a lower intensity light environment, using higher ISO.

In the past, it was essential having a high intensity light environment, in order to get good quality photos, characterized by sharp and clear images with low noise. In the context of facial photography, subjects usually squint their eyes in a continuous high intensity lighting system. Thus, synchronized external flashing light source is crucial. Recent improvement in camera now allows surgeons to capture high quality images despite lower light intensity. Light sources, which generate continuous lower intensity light, such as household fluorescent light bulb, are adoptable without any effect on facial expression. An observation lamp is perfect fit for our usage, because it composes of a circular-shape fluorescent light bulb with reflector. Circular-shape light bulb gives an area of light omitted

which is broader than subjects' face. This results in softer images without using any kinds of light diffuser, such as soft box or reflective umbrella. Furthermore, level of the lamp is also easy to adjust and match the level of patients' face.

Kid's studio requires only a compact camera, which is light and easy to carry. In our study, we used the P mode for all tested setups, due to ease of its application for the users. With the P mode, most of the cameras not only automatically set values of aperture and shutter speed, but also ensure that the shutter speed is fast enough to prevent photograph from motion blur. The worry that automatic selection of an excessively-wide lens aperture may result in a narrow depth of field which may not sufficiently capture all facial detail is largely unfounded. The image sensor in compact cameras is smaller compared to full-frame DSLR and thus the effect of aperture value will have minimal effect on depth of field, especially in a situation that subject-to-background distance is shorter than camera-to-subject distance. In our experience, all facial detail will be in sharp focus.

Those with better technical grasp of photography may customize the camera setting using aperture priority mode (Av mode) or manual mode (M mode). The only caution is shutter speed must be faster than 1/40 second, in order to prevent the photos from motion blur otherwise a tripod is needed.

Other kinds of compact or DSLR camera with equal or better performance can also be used. We would recommend users to make sure that the ISO of the camera, which gives acceptable image noise, is equal or more than 500. Otherwise it will be impossible to obtain the shutter speed at 1/40 second or faster, if the lower ISO is applied.

Despite the fact that the differences between photographic studio setup and Kid's studio scores were statistically significant ($p<0.001$), the studio setup is expensive, impractical and requires specific area. Without availability of studio setup we propose a simple, reproducible, consistent and applicable setup to achieve photographic standards of the face right in the OPD.

Conclusion

The authors introduced the "Kid's studio" method of clinical photography, which produces high-quality clinical photographs with use of simple, easily available equipment that can be found in most hospitals and clinics. As compared with other methods of photography such as on-camera flash photography or conventional non-flash photography, Kid's studio has been demonstrated to produce consistently higher scores. As such, the authors recommend the implementation of this technique for clinical photography, in order to meet photographic standards outside of photographic studio.

What is already known on this topic?

Standard medical photography for patients undergoing plastic surgery procedure has relied on a proper studio setup for decades. As standard studio setup is either rarely available or impractical in most hospitals and clinics. Most plastic surgeons ignore standard photography and use easier ways to take photos instead. Two common techniques that are widely used are taking photos with on-camera flash and taking photos without additional light. Both of these techniques give poor quality photos such as harsh shadow that obscure details of the subject while using on-camera flash, motion blur or noise artefact while using ordinary light, etc. Therefore, we introduce a new practical photographic setup that provides good quality photos closed to photos taken from standard studio setup.

What this study adds?

This study introduces a new way to take photos of patients in the field of plastic surgery, which is easy, cheap and practical in most settings. Quality of photos obtained from this new technique is high enough to serve all purposes of photographic usage in plastic surgery, including clinical comparison of surgical effects, educational presentation, and high quality publication. This new technique avoid using standard photographic studio setting, which is not practical in most medical settings, as it is rarely available or usually separated and far away from the out-patient clinic. This new photographic setup will facilitate plastic surgeons to obtain better quality photos of their patients, leading to better patient care.

Potential conflicts of interest

None.

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การติดตั้งอุปกรณ์อย่างง่ายสำหรับการถ่ายภาพผู้ป่วยศัลยกรรมตกแต่ง: คิดส์สตูดิโอ

กิดากร กิระนันทวัฒน์, วาสิตา เสริมสกุลวัฒน์, Matthew Sze-Wei Yeo, ภาณุวัฒน์ เลิศสิทธิชัย, ศรัณย์ วรศักดิ์วุฒิพงษ์, อาทิ เครือวิทย์, Stamatis Sapountzis, สรายุทธ ดำรงวงศ์ศิริ, วิชัย ศรีมุนินทร์นิมิต, เฉลิมพงษ์ ฉัตรดอกไม้ไพร

ภูมิหลัง: *ภาพถ่ายผู้ป่วยก่อนและหลังผ่าตัดนั้นมีความสำคัญอย่างมากในศัลยศาสตร์ตกแต่งฯ การถ่ายภาพที่ดีนอกจากจะต้องได้ภาพที่มีคุณภาพสูงแล้ว ยังต้องการความสะดวก ประหยัด และคล่องตัวอีกด้วย ปัจจุบันวิธีการถ่ายภาพมาตรฐานสำหรับผู้ป่วยศัลยกรรมตกแต่งฯ ให้ได้คุณภาพดีนั้น ต้องการห้องสตูดิโอระดับมืออาชีพ ซึ่งจำเป็นต้องใช้อุปกรณ์ที่มีราคาสูง อีกทั้งยังใช้พื้นที่มากและไม่สะดวกในเชิงปฏิบัติ*

วัตถุประสงค์: *ผู้นิพนธ์ได้นำเสนอการจัดสตูดิโออย่างง่าย ซึ่งสามารถทำได้ในห้องตรวจของสถานพยาบาลส่วนใหญ่ ด้วยการประยุกต์ใช้อุปกรณ์ที่มีอยู่แล้วในสถานพยาบาลนั้นๆ โดยให้ชื่อการจัดสตูดิโออย่างง่ายนี้ว่า คิดส์สตูดิโอ (Kid's studio) จากนั้นจึงทำการศึกษาเปรียบเทียบคุณภาพของภาพที่ได้จากคิดส์สตูดิโอกับภาพที่ได้จากสตูดิโอถ่ายภาพระดับมืออาชีพ และเทียบกับเทคนิคอื่นๆ ที่นิยมใช้ในการถ่ายภาพผู้ป่วยในสถานพยาบาลทั่วไป ซึ่งได้แก่เทคนิคการถ่ายภาพด้วยแสงธรรมชาติในห้องตรวจ และเทคนิคการถ่ายภาพโดยใช้แฟลชหัวกล้อง*

วัสดุและวิธีการ: *ผู้นิพนธ์ได้ทำการศึกษาในกลุ่มตัวอย่างจำนวน 20 ราย (ผู้ชาย 9 คน และผู้หญิง 11 คน) โดยทำการถ่ายภาพกลุ่มตัวอย่างทั้งหมดด้วยเทคนิคการถ่ายภาพทั้ง 4 วิธีข้างต้น จากนั้นนำภาพที่ได้มาสุ่มจัดเรียงและพิมพ์ลงกระดาษสำหรับอัดภาพถ่าย ส่งให้ผู้ประเมินทำการให้คะแนนคุณภาพของภาพถ่ายในหัวข้อต่างๆ ได้แก่ สีของภาพ ความสว่าง ความคมชัด รายละเอียดบนใบหน้า เงา ระยะชัด (depth of field) และคุณภาพภาพถ่ายโดยรวม โดยคะแนน 0 หมายถึงด้อยที่สุด และคะแนน 10 หมายถึงดีที่สุด*

ผลการศึกษา: *พบว่าภาพถ่ายจากคิดส์สตูดิโอได้คะแนนประเมินคุณภาพภาพถ่ายโดยรวมมากกว่าภาพที่ถ่ายโดยวิธีการใช้แฟลชหัวกล้อง และวิธีการถ่ายภาพด้วยแสงธรรมชาติในห้องตรวจโดยภาพที่ได้จากคิดส์สตูดิโอมีค่าเฉลี่ยของคะแนนที่ได้เท่ากับ 8.98 ในขณะที่อีกสองวิธีดังกล่าวได้คะแนนประเมินเท่ากับ 6.8 และ 5.17 ตามลำดับ นอกจากนั้นค่าเฉลี่ยของคะแนนประเมินในหัวข้อย่อยต่างๆ ก็ได้ผลของคิดส์สตูดิโอที่เหนือกว่าวิธีอื่นๆ ในลักษณะเดียวกัน*

สรุป: *ผู้นิพนธ์นำเสนอคิดส์สตูดิโอ ซึ่งเป็นการจัดสตูดิโออย่างง่ายเพื่อให้แพทย์สามารถเก็บภาพผู้ป่วยที่มีคุณภาพสูงได้โดยสะดวก โดยใช้อุปกรณ์ที่หาได้ง่ายในสถานพยาบาลส่วนใหญ่ เมื่อทำการเปรียบเทียบคุณภาพของภาพที่ได้จากคิดส์สตูดิโอกับเทคนิคการถ่ายภาพวิธีอื่นๆ แล้วพบว่าภาพที่ได้มีคุณภาพสูงใกล้เคียงกับภาพที่ถ่ายจากสตูดิโอระดับมืออาชีพ ซึ่งมีราคาสูงและไม่เหมาะกับการใช้งานจริง คณะผู้นิพนธ์จึงแนะนำให้ใช้เทคนิคที่นำเสนอนี้เพื่อเป็นทางออกให้กับสถานพยาบาลที่ไม่สามารถติดตั้งสตูดิโอถ่ายภาพระดับมืออาชีพได้*