Optimizing Image Quality with Advanced Post-Processing Techniques: Clinical Examples

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Introduction

The post-processing technique in digital X-ray is an important function for producing optimum image quality as it can correctly restore the sharpness of details without introducing artifacts, which can improve diagnostic accuracy [1]. One of the strengths of Samsung's Digital X-ray systems, such as the GC80, GU60, and GC85A has been their image processing software which allows an efficient workflow and customization for optimal image quality.

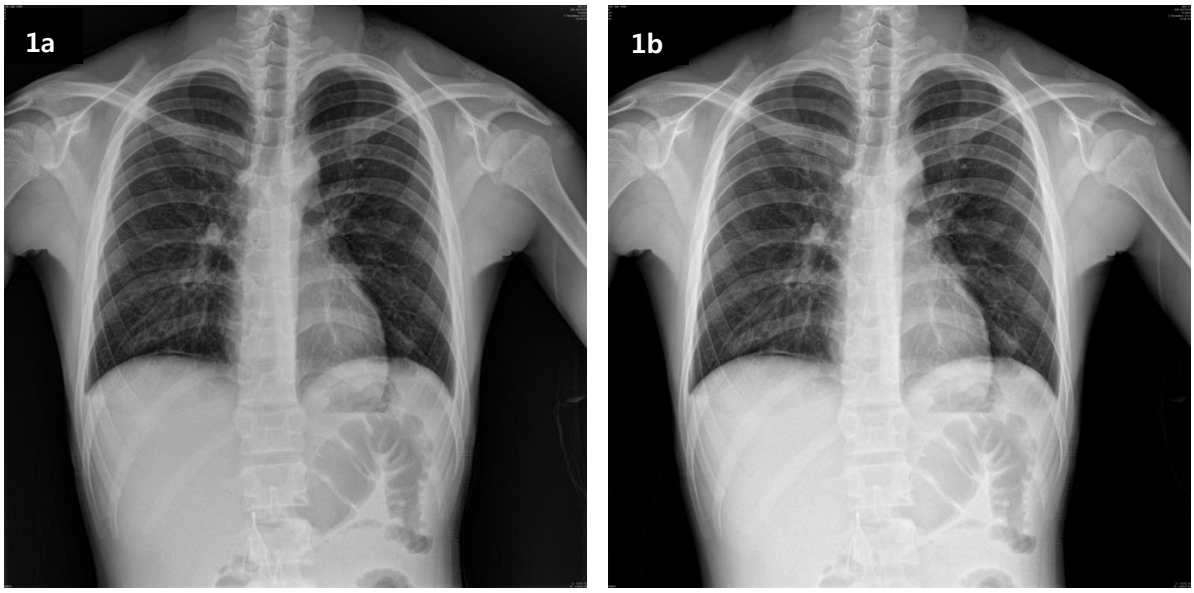
The new upgraded S-Vue Image Processing Engine, S-Vue 3.0, reduces noise and consistently provides high quality images. S-Vue 3.0 provides clear image quality in real patient cases wherein pulmonary blood vessels or overlapping joint areas must be depicted accurately. **At Samsung Medical Center (SMC), we expect to provide an even more enhanced healthcare with the upgraded imaging software from Samsung Digital X-ray System.** The core feature of the post-processing algorithm is protocol adaptive processing; it is based on ROI (region of interest) gradation processing, protocol adaptive ROI detection, and enhancement. These features result in improved reproducibility and produce more visible details. We have collected several clinical cases with the S-Vue engine, which are presented in this paper.

Materials and Methods

All the images presented in this paper were obtained using a **Samsung GC80 X-ray system** with standard kVp/mAs settings for the appropriate body parts. The obtained raw X-ray images were post-processed twice: once with a conventional S-Vue 2.0, and once with the upgraded S-Vue 3.0. Figure 1a, 2a, 3a, 4a, and 5a show the images processed with S-Vue 2.0, and Figure 1b, 2b, 3b, 4b, and 5b show the images processed with S-Vue 3.0, respectively. All window width and level are set to have same values.

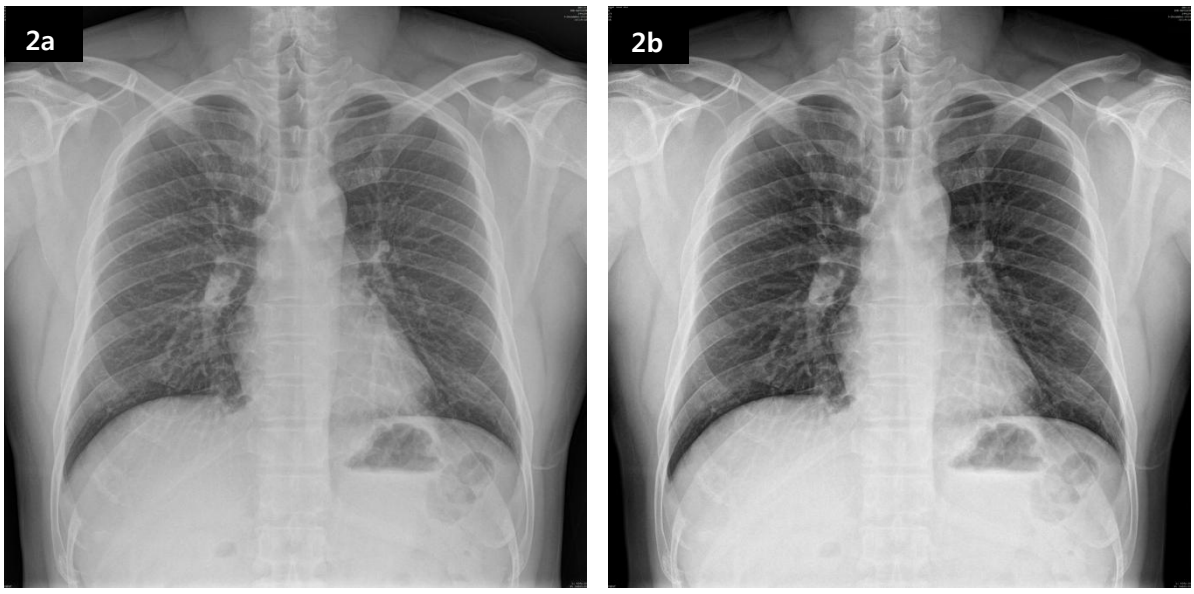
Clinical Evaluation

Case 1: Early twenties, male, thin person



Compared to Figure 1a, vascular opacity is more clearly visible in Figure 1b. Also, the vertebra and rib areas are well recognized.

Case 2: Mid thirties, male, thick person



Comparing Case 1 and Case 2 (thin and thick patient) we can see that S-Vue 2.0 shows inconsistent lung density between Figure 1a (thin) and (thick) 2a. However, in the S-Vue 3.0, lung density is consistent regardless of body size, as shown in Figure 1b and 2b.

Case 3: Early seventies, female

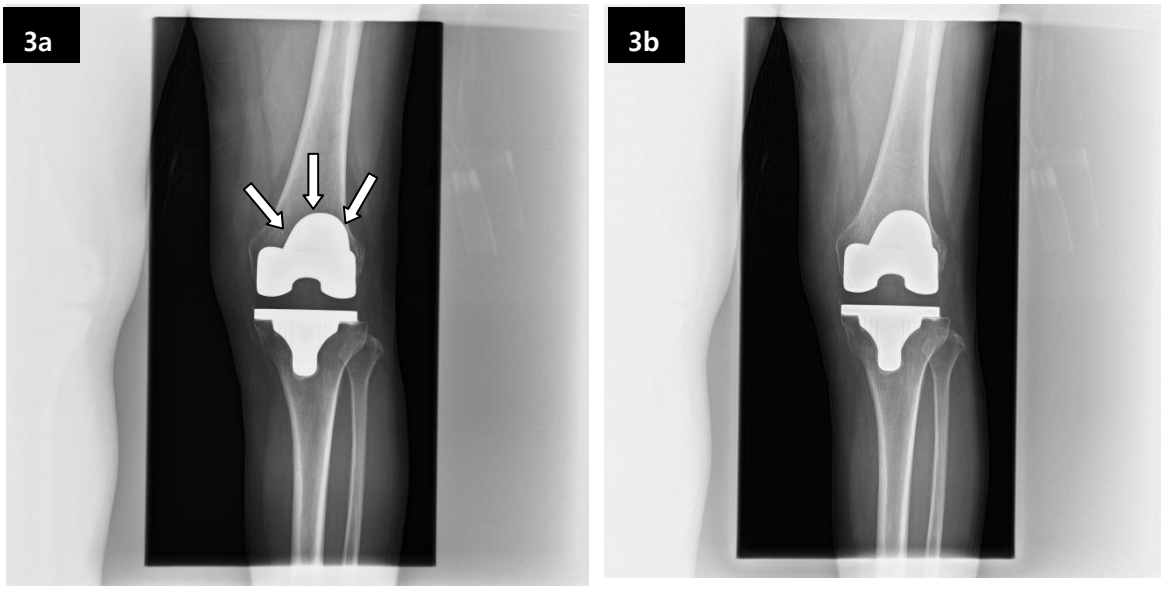


Figure 3a shows radiolucent halo around the prosthesis (arrows). However, this is not seen in Figure 3b. The corticomedullary differentiation of the whole bone and the contrast with regional soft tissue is better than in Figure 3a.

Case 4: Early sixties, female

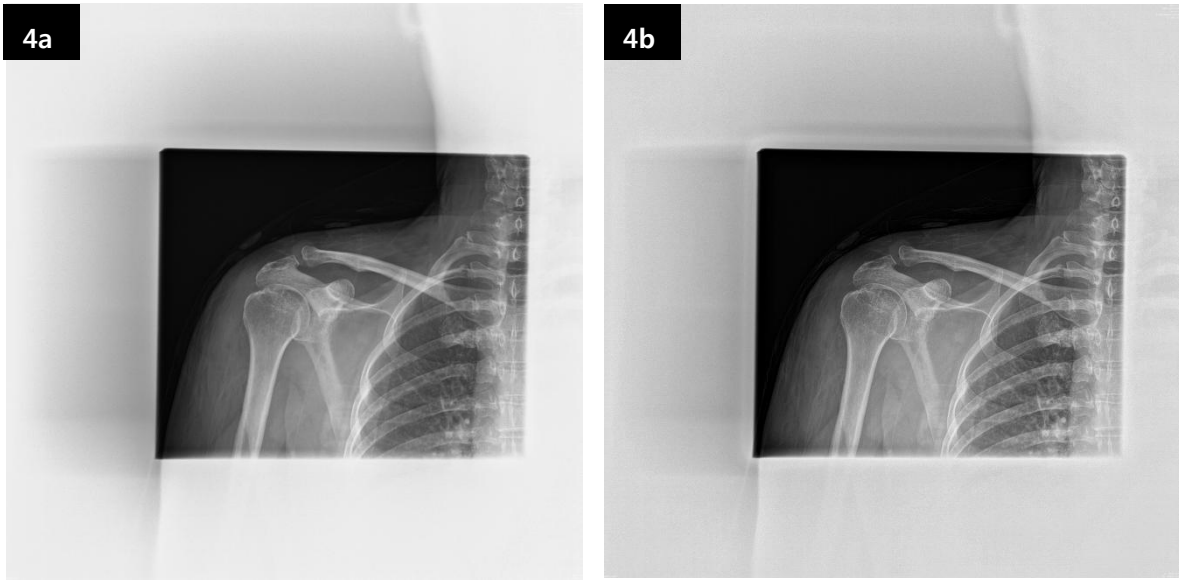
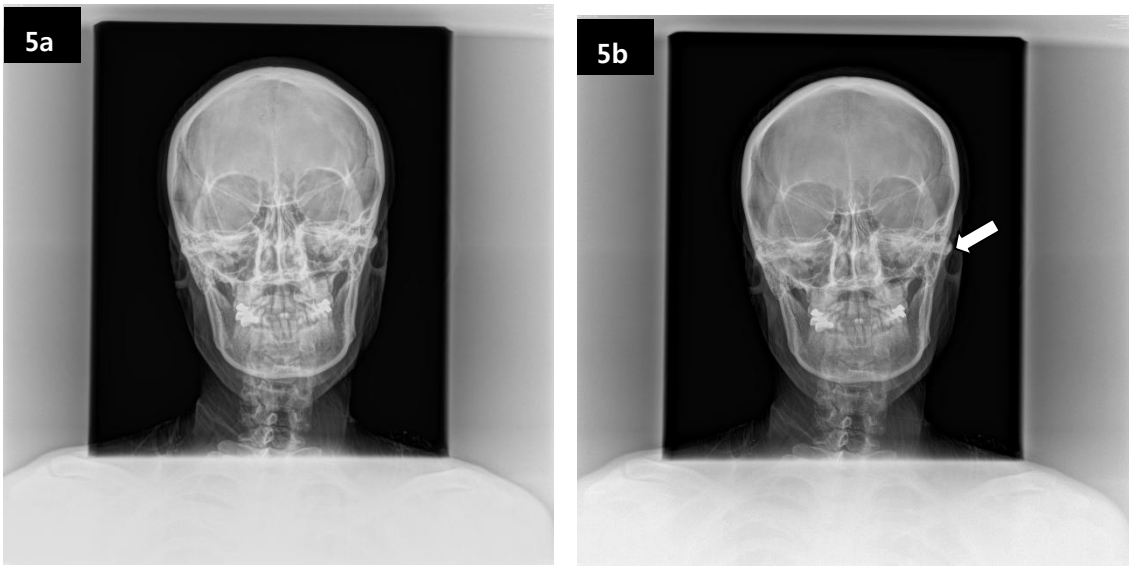


Figure 4b shows better resolution of overlapped bones at the glenohumeral joint. The corticomedullary differentiation of bones are also better. The regional soft-tissue as well as the margins of the joint are more clearly visible.

Case 5: Mid forties, female



In Figure 5b, bilateral mastoid air cells and the sutures of the skull bone are more clearly seen than in Figure 5a (arrow). The corticomedullary differentiation is superior to Figure 5a. Details of the soft tissue such as the nasal turbinates are clearly seen.

Conclusion

Several clinical cases show that S-Vue 3.0 has clinical advantages over S-Vue 2.0. Specifically, the detailed expression and contrast are improved.

References

[1] K. P. Andriole, etc., ACR-AAPM-SIIM Practice Guideline for Digital Radiography, J. Digit Imaging 2013; 26:26-37