

LETTER TO THE EDITOR

The Application of Conventional Joint Replacement Templating Techniques to Digital Radiographs: A Novel Technique

To the Editor,

Pre-operative templating in arthroplasty is essential in improving surgical precision¹. More hospitals in Malaysia are employing digital radiographs for this reason. Unfortunately, the software used in arthroplasty templating is implant specific, and quite costly. I describe here a novel technique for preoperative templating in hip arthroplasty using template sheets meant for use with conventional radiographs. This technique is generic for all implants, and doesn't require the added cost of specialized software.

Every radiograph has a magnification factor, be it digital or conventional. The magnification factor can be manipulated in digital radiographs, but this inherent 'problem' in conventional radiographs, has made it necessary for conventional template sheets to 'compensate' for this magnification factor of approximately 15 to 20%. During the templating process, a 'true sized' image is required, i.e., without magnification or down-sizing. The challenge is to fit this image in its entirety on the monitor screen. Before applying the templating sheet on the digital radiograph, it is important to ensure that the dimensions of the image on the monitor screen very closely approximate those of the image on a conventional radiograph. Once this is achieved, any templating device can be directly applied to the monitor screen, to make the necessary measurements.

All digital radiograph set-ups come with the necessary software to measure distance. The first step involves constructing a 100mm line on the digital radiograph image (Figure 1a). The magnification of the image is then manipulated (zoomed in or out), until the line on the screen measures 100mm. This is confirmed with a mechanical ruler applied to the screen (Figure 1b, 1c). With the completion of these steps, the final digital image viewed on the monitor screen, should very closely approximate the actual dimensions seen on the conventional radiograph. The templating process can then be performed with the templating sheet applied directly to the monitor screen (Figure 1d).

Performing a total hip replacement without pre-operative templating can be dangerous and may result in an undersized femoral stem, leg length inequality, incorrect offset or failure to reconstruct an anatomical hip centre. This method presents surgeons with an alternative method to conventional templating techniques for the digital radiograph images. The use of digital radiograph should not be use as excuse for not conducting preoperative templating.

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Fig. 1(a): Construct a 100 mm line using computer's tool.



Fig. 1(b): 100 mm line drawn using computer tool will not measured 100 mm using mechanical ruler because of digital magnification.



Fig. 1(c): Zoom in until the line measures 100 mm using mechanical ruler. Once this is achieved, the image size on monitor will closely approximate conventional radiograph.

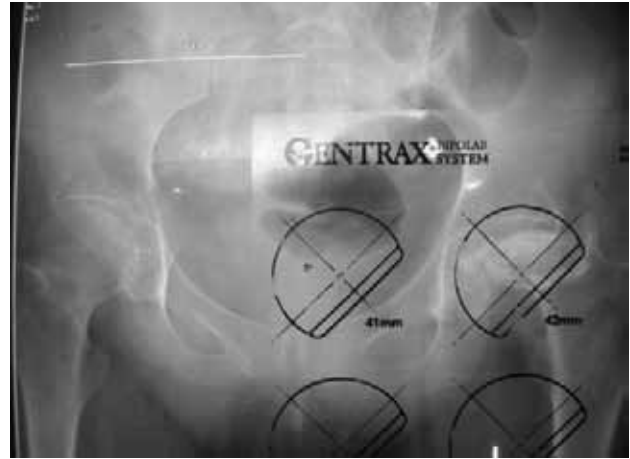


Fig. 1(d): Apply template on monitor and start templating.

REFERENCES

1. Egli S, Pisan M, Muller ME. The value of preoperative planning for total hip arthroplasty. *J Bone Joint Surg [Br]*1998; 80(3): 382-90.