

Advances in Digitalized Preoperative Templating in Orthopedic Surgery

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Preoperative templating is an essential part of many orthopedic operations including joint arthroplasty, fracture reduction and fixation, as well as deformity correction [1]. In this issue of *IMAJ*, Steinberg et al. [2] review recent advances in the techniques of preoperative templating, including computerized systems.

Why should the technique of preoperative templating commonly used today be improved? The current technique consists of measuring certain anatomic landmarks, sometimes on the opposite bone if the side to be operated is fractured or deformed. This technique often allows assumptions to be made regarding positioning of an implant such as a total hip replacement [3]. The underlying assumption in such templating is that the bones are symmetric, allowing measurements of the contralateral bone. While this assumption is often true [4], there are exceptions to this rule especially if the affected side has suffered from a developmental disorder such as hip dysplasia or poliomyelitis.

Another method of preoperative templating consists of overlaying a transparency on which the implant is outlined on a radiograph. This technique has become irrelevant since most hospitals today use the PACS digital archiving system. Using a transparency carries the risk that the magnification of the radiograph is incorrectly calculated. Magnification of the bones on preoperative radiographs can vary despite the use of standardized radiological techniques, and the expected accuracy is about 60% [5]. Templates will give misleading measurements unless this magnification is quantified [6].

Recent computerized systems and augmented reality systems were developed to improve accuracy of preoperative templating [7]. The advantage of such systems is improvement of the known poor accuracy and interobserver discrepancy of manual templating [8]. Such systems also allow accurate preoperative assessment of deformities including both angular and rotational deformities [9].

The next development stage of preoperative templating should include an intraoperative navigating system that allows precision execution of the preoperative planning. Recently there have been some developments in semi-active haptic robotic systems that provide intraoperative tactile feedback to the surgeon [10]. Proponents of robotic technology believe that these improvements may lead to superior functional outcomes and implant survivorship.

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“It is better to light a candle than curse the darkness”

Eleanor Roosevelt (1884-1962), American politician, diplomat and activist. She was the longest-serving First Lady of the United States, holding the post from March 1933 to April 1945 during her husband President Franklin D. Roosevelt's four terms in office and served as the U.S. delegate to the United Nations General Assembly from 1945 to 1952. President Harry S. Truman later called her the “First Lady of the World” in tribute to her human rights achievements