

## How to establish and standardize wide-awake hand surgery: experience from China

Journal of Hand Surgery  
(European Volume)  
2017, Vol. 42(8) 868–870  
© The Author(s) 2017  
Reprints and permissions:  
sagepub.com/journalsPermissions.nav  
DOI: 10.1177/1753193417728439  
journals.sagepub.com/home/jhs



Performing hand surgical procedures under local anaesthetics mixed with epinephrine to stop bleeding in the surgical field and thereby avoiding use of the tourniquet is called 'wide-awake hand surgery'. Chinese hand surgeons have been unfamiliar with this technique until a few surgeons in Nantong used this approach after Dr Don Lalonde from Canada had introduced this technique years before. Chinese hand surgeons have been quickly adopted this approach over the past 3 years because the patients of hand surgery in this country are traditionally awake during surgery with brachial plexus block as the conventional anaesthesia. Adding epinephrine to local anaesthetics is innovative, efficiently eliminating the need of the tourniquet and the presence of anaesthesiologists for selected procedures. This technique is still being popularized. We introduce the experience from two major hospitals of how to establish and standardize wide-awake hand surgery.

In the Hospital of Nantong University, currently 1/4 to 1/5 of the hand surgery cases are performed with this approach, which translates to 800 to 900 operative cases annually. This practice started 6 years ago, with sporadic adoption in the earlier years for carpal tunnel release, treatment of metacarpal fractures, tenolysis, and primary flexor and extensor tendon repairs. In more recent years, this technique has been applied for cubital tunnel release, local flap transfer, tendon transfer, nerve repairs and joint surgeries in the hand.

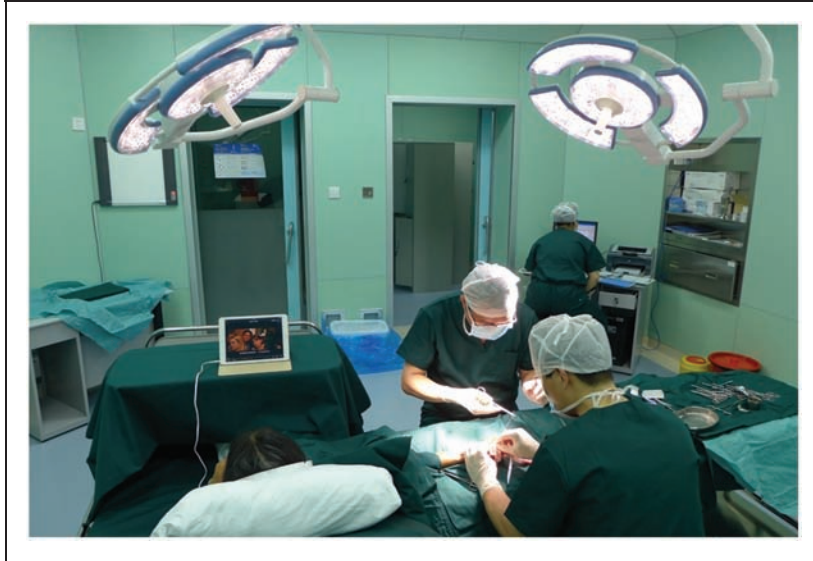
In practice in this unit, deviations and evolution from the standard techniques include the following. (1) After injection of epinephrine, the waiting time ranges from 5 to 30 minutes; we do not strictly wait for 20 to 25 minutes to start surgery. (2) We use epinephrine in local pedicle flap surgery to reduce blood loss of the flap. With this approach, pedicle flaps have little risk of circulation problems. (3) A temporary upper arm tourniquet can be applied, often for 5 minutes, to stop bleeding in the surgical field if a patient wants to have the surgery start sooner with less waiting time. Such practice is tolerable for the patients treated in this hospital. This measure

increases the flexibility of when to start an operation. This is especially welcome by the patients requiring emergency care. (4) Digital replantation can be performed using this approach without affecting circulation of the replanted digits.

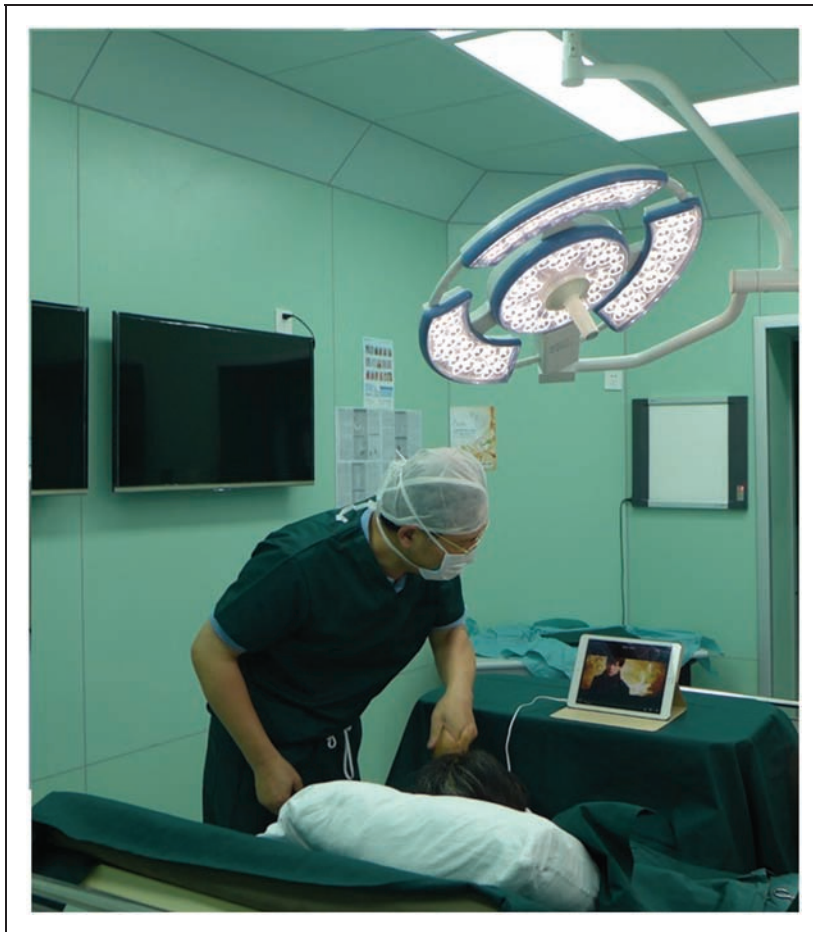
In the hospital in Nantong, a newly established operating room solely for wide-awake hand surgery was established, and both surgeons and patients are always favouring the use of this facility. This results in reduced costs and provides easy access and simplified workflow for both patients and surgeons and a more pleasant patient experience (Figures 1 and 2). Their experience indicates that such a specialized operating room is a key to wide-spread and routine use of this approach in a major or teaching hospital.

In Tianjin Hospital, adaptation of such an approach was rather recent, but the popularization there has been faster than most surgeons could image. The first use of this approach was in February of 2016. Within 15 months, 3107 patients have had hand surgery using this approach. From February 2016 to May 2017, among the patients treated with this approach, 2562 patients had open trauma needing emergency surgical procedures, including 721 patients with open fractures treated with internal fixation, 667 patients with primary nerve and tendon repairs, 1174 patients with debridement and extensive wound closure. Five hundred and forty-five patients had elective procedures with this approach, including 175 patients with open reduction of closed fractures and internal fixation or fixation removal, 326 patients with neurolysis, 44 patients with tendon repair, tenolysis or tendon transfers.

In Tianjin Hospital, two surgeons started using the wide-awake approach in 2016. Its use was thereafter quickly popularized within the department to all staff hand surgeons in treating appropriate patients. From January to May of 2017, the department, with more than 20 staff hand surgeons, applied this approach to more than 2000 patients. Their departmental workflow has been remarkably optimized with dramatic cost-saving and greatly increased efficiency. The department head has been a great driving force for



**Figure 1.** The general setting of the *Wide-Awake Surgical Theatre* in the Department of Hand Surgery, Nantong University. Two surgeons are operating, one nurse is circulating and the patient is watching a movie with a tablet computer and earphone.



**Figure 2.** During surgery, surgeons can inform the patient about progression of surgery and educate the patient about postoperative rehabilitation. The surgeons usually also inquire about experience of patients in the operating theatre. Most patients express gratitude and say they are having a pleasant experience.

the application, and he described the process of popularizing this approach in Tianjin Hospital as: *'I wanted them to use it a year ago; a year later, they—all of the hand surgeons—want to use it'*.

The cumulative experience is more than 6000 patients treated in the two hospitals, with injection of local anaesthetic of 0.5% or 1% lidocaine with 1:100,000 epinephrine in these patients. None had epinephrine-related complications. The use of this approach has also been included into trainee teaching in both hospitals. The medical cost for the patients has been reduced by roughly 40%. On 15 June 2017, Mr C. Y. Ng, 2017 British Society for Surgery of Hand Stack travelling fellow, spent an afternoon in Nantong with Professor Jin Bo Tang. In the tour in the hospital, they saw wide-awake surgeries going on in the Wide-Awake Surgical Theatre in the Department of Hand Surgery. He was impressed by the scale and number of patients in

hospital and commented that the scale of the size of many hospitals in China was hard to imagine if not actually visiting them, and the possibility of rapid adaptation of a technique and accumulation of huge amount of its experience in a rather short period of time is just unbeatable. The experience from the two hospitals described in this article indicates that establishing specialized operating facilities used for performing wide-awake hand surgery and disseminating the techniques to all members of a hand surgery department would facilitate standardization of this technique.

**Ke Tong Gong<sup>1</sup> and Shu Guo Xing<sup>2,\*</sup>**

<sup>1</sup>Department of Hand Surgery, Tianjin Hospital, Tianjin, China

<sup>2</sup>Department of Hand Surgery, Affiliated Hospital of Nantong University, Nantong, China

\*Corresponding author: xingshuguo10@163.com