

## The Impact of Telemedicine in the Postoperative Care of the Neurosurgery Patient in an Outpatient Clinic: A Unique Perspective of this Valuable Resource in the Developing World—An Experience of More Than 3000 Teleconsultations

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Telemedicine has always been used as a teleconsultation tool in neurological emergencies (e.g., triage in head injuries, stroke, and cerebrovascular accidents). At Sri Sathya Sai Institute of Higher Medical Sciences, Bangalore, India, we have been operating two teleconsultation sessions per week for the postoperative patient population, addressing routine follow-up and semiemergent conditions in this cohort of patients. At our center more than 80% of the neurosurgical procedures are conducted in patients traveling more than 1500 km. Telemedicine as a routine tool in clinical medicine has significant financial and psychosocial benefits versus routine outpatient clinics. There are very few reports of telemedicine use in routine outpatient teleconsultations in the available neurosurgical literature; those that are present do not differentiate or analyze the use in routine versus emergency neurosurgery. We discuss the role of this underused resource in the developing countries and retrospectively analyze the clinical data in more than 1500 patients and 3000 teleconsultations during a period of 6 years. We address the financial implications, psychosocial factors, and several other factors that could make this relatively modest technology an indispensable tool in current neurosurgical practice, especially in a developing country like India.

### INTRODUCTION

There has always been a paucity of neurosurgeons in the developing world (3). Recent figures suggest that there are about 1300 qualified neurosurgeons in India catering to a population of about 1.3 billion people, an average of 1 neurosurgeon for every million population (2). This is in sharp contrast to the ratio of neurosurgeons to the population in most developed nations. In the United States, the modern epitome of health care, a government-sponsored study on surgical services, in 1977, had recommended the desired ratio of 1 neurosurgeon per 100,000 population (10). Recent estimates have put this figure anywhere between 1:55,000 to 1: 65,000 (10).

In India, an estimated net population gain of 1,911.8 occurs every hour (2). Fifty to 100 new neurosurgeons qualify in the country each year (4, 9). What heightens this disparity further is that qualified surgeons prefer to practice in large metropolitan cities to overcome professional isolation (3). The lack of infrastructure in rural areas is another compounding cause for this distribution of specialized neurosurgical services (3). Statistics published in 2002 shockingly revealed that only 450 million of the 1,060 million Indians had access to neurosurgical care (3). In countries like India where the majority of people still live in a rural setting, access to specialties, like neurosurgery, is difficult and when the patients do manage to travel long distances for definitive management, they are usually lost to follow-up.

The recent rapid technologic advancements in the developing world, especially in telecommunications, have meant at least a virtual follow-up with this cohort of patients. Telemedicine has

### Key words

- Neurosurgery
- Outpatient
- Postoperative
- Socioeconomic
- Teleconsultation
- Telemedicine

### Abbreviations and Acronyms

**CCC-r:** Change in clinical condition requiring a review at the SSSIHMS OPD

**HIS:** Hospital Information System

**OPD:** Outpatient department

**SSSIHMS:** Sri Sathya Sai Institute of Higher Medical Science

**TMNS:** Telemedicine in neurosurgery



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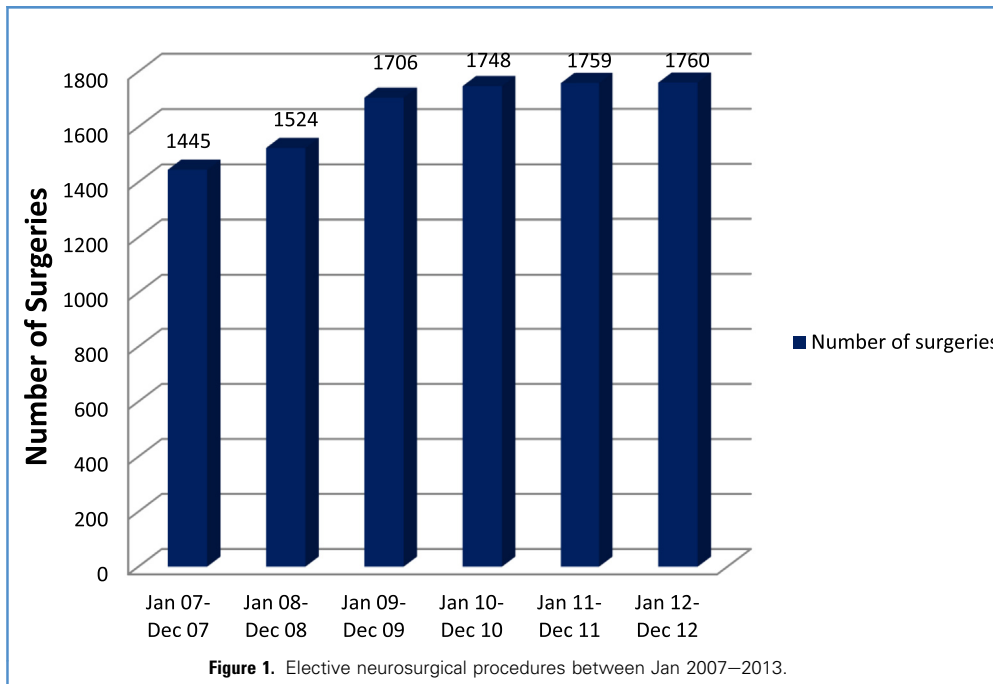
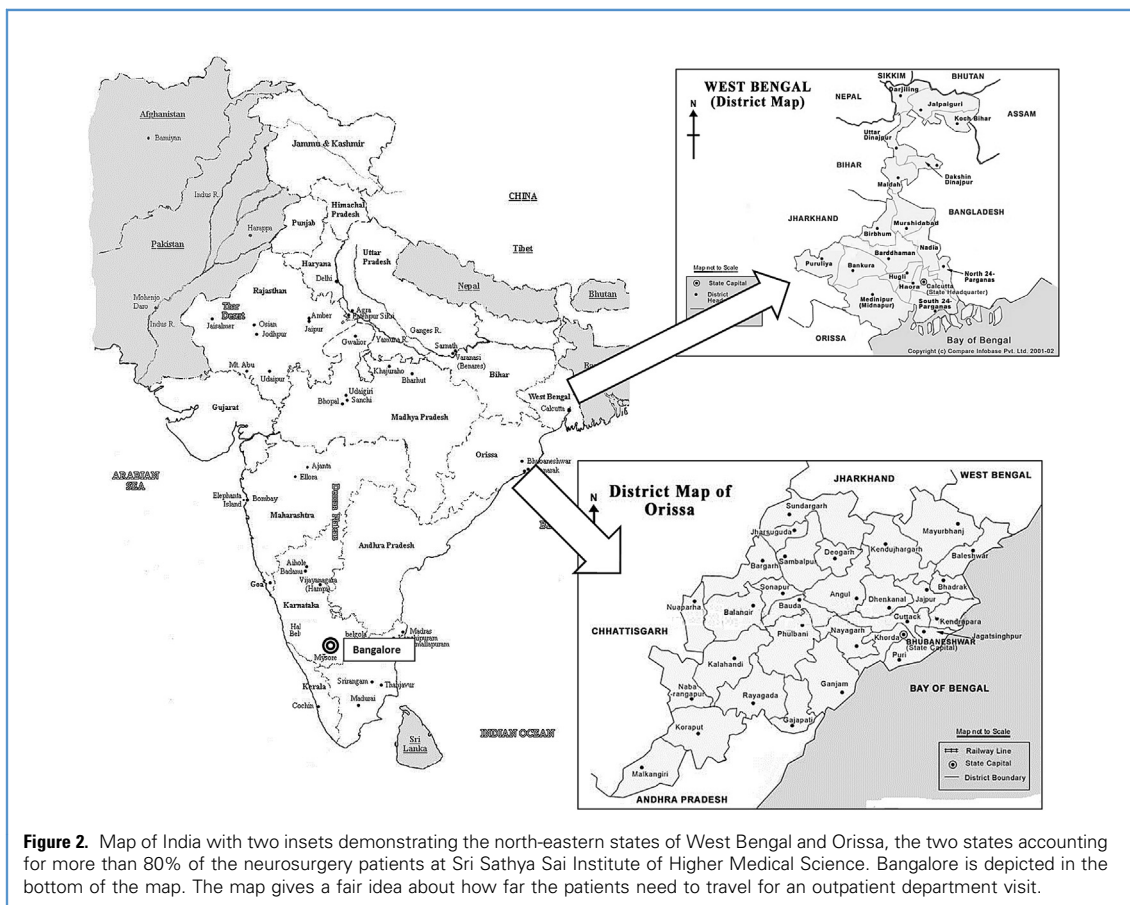


Figure 1. Elective neurosurgical procedures between Jan 2007–2013.



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