THE INSTRUCTIONAL VALUE OF INTERNATIONAL SURGICAL VOLUNTEERISM FROM A RESIDENT’S PERSPECTIVE

VALEUR ÉDUCATIVE D’UNE CHIRURGIE BÉNÉVOLE INTERNATIONALE, VUE PAR UN RÉSIDENT

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SUMMARY. The aim of this article is to document the experience of the author who volunteered as a resident for 6 months at a district-level hospital in central Kenya. Peculiarities emerging from the report are: specificity of the experience to plastic reconstructive surgery; highly complex reconstructive procedures performed under direct supervision of a qualified mentor; exposure to diverse approaches through collaboration with different volunteer plastic surgeons; enhancement of long-term surveillance; and opportunity to expand surgical knowledge outside one’s field of specialty. The humanitarian setting allows maximal exposure and learning and can play a significant role in the resident’s education.

Keywords: education, developing nation, international, plastic surgery, residency, volunteerism

RÉSUMÉ. Le but de cet article est de rapporter l’expérience de l’auteur, qui a effectué un stage bénévole de résident pendant six mois dans un hôpital régional au centre du Kenya. Les particularités qui ressortent de ce rapport sont: le caractère spécifique de l’expérience en chirurgie plastique et reconstructrice; la complexité des techniques de chirurgie réparatrice réalisées sous la surveillance d’un mentor qualifié; la confrontation avec diverses attitudes chirurgicales à travers la collaboration de différents chirurgiens plastiques bénévoles; l’amélioration de la surveillance à long terme; l’opportunité d’élargir ses connaissances chirurgicales au-delà de son champ habituel. Les conditions de médecine humanitaire permettent un maximum de vision et d’apprentissage, et peuvent jouer un rôle significatif dans la formation du résident.

Mots-clés: enseignement, pays en voie de développement, international, chirurgie plastique, résidanat, bénévolat

Introduction

Participation of plastic surgery residents in volunteer service missions to developing nations has been acknowledged as an effective instructional tool in the modern competency-based residency curriculum.1,2 Despite initial controversy in the academic plastic surgery community, examination of resident participation in international surgical care showed how this experience provides a unique opportunity for intensive instruction and application of knowledge to patient care, within a unique cultural setting.3 Most plastic surgery missions in underserved areas tend to manifest as short-term medical missions. Nonetheless, young physicians partaking in these trips report a high satisfaction rate both from a professional and a personal standpoint.4

The aim of this article is to document the experience of the author (I.T.T.) who volunteered as plastic surgery resident for 6 months at a district-level hospital in central Kenya. The mission experience was the response to the author’s request for an international health opportunity within the residency training program, and part of an international project aimed at providing plastic reconstructive surgery for underserved areas.

Materials and methods

The experience was designed as a 6-month international surgical elective. Leave of absence was granted in the final year of residency training in plastic surgery and an agreement was made to acknowledge the months spent overseas as part of the official training. The location was chosen in coordination with Help for Life Foundation Onlus (Padova, Italy), a non-profit charity association founded in 2006 that provides medical missions to developing countries. Among the different ongoing projects, the decision was made to serve at North Kinangop Hospital.

North Kinangop is a rural town located in central Kenya at an altitude of 2,500 meters and approximately a 2-hour drive (130km) northwest from the capital Nairobi (latitude - 0.611546; longitude 36.706506). The hospital has a catchment population of around 180,000 people within the district (Nyan-
Darua) and provides 4th level health care services to the town’s inhabitants (67,000) (Figs. 1 and 2). For details regarding the facility please refer to Table I.

The hospital is currently administered by the local Catholic diocese. All physicians, nurses and ancillary staff are Africans. The Kenyan Ministry of Health has assigned specialists in internal medicine, general surgery, pediatrics and gynecology (one per branch) to the hospital. Two general practitioners (medical officers) who serve on the medical and surgical ward respectively complete the medical staff. Medical missions from developed nations provide further specialized care on a regular basis in the fields of plastic surgery, otolaryngology, urology, pathology and pediatric orthopedics.

Specialists in plastic surgery have been coordinated by Help for Life Foundation since April 2014, alongside the Clinic of Plastic and Reconstructive Surgery of the University of Padova, Italy. Three-week mission trips have been provided on a regular basis since then, the mission team consisting of a senior plastic surgeon and a plastic surgery trainee. The author’s agreement with the Foundation was to volunteer as junior team member for the visiting plastic surgeons and serve as perma-

**Table I** - Details regarding North Kinangop Hospital

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
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<tbody>
<tr>
<td>Serves a population of 180,000 people in rural Nyandarua district, central Kenya</td>
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<tr>
<td>192 beds</td>
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<tr>
<td>Average percentage bed occupancy: 60%</td>
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<tr>
<td>Average inpatients per year: 5,500</td>
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<tr>
<td>Wards: medical, surgical, pediatric, maternity</td>
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<tr>
<td>Services: radiology (X-ray, ultrasound), laboratory and blood bank, pharmacy</td>
<td></td>
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<tr>
<td>physical therapy service, dental clinic, maternal and child health service</td>
<td></td>
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<tr>
<td>4 operating theatres</td>
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</table>
nnent referral for plastic surgery services over the 6-month period. The aims of the project are stated in Table II.

## Results

During the 6-month period the author participated in four 3-week plastic surgery blocks. Each block was run by a western-trained volunteer plastic surgeon with no less than 10 years of experience in the field of his/her qualification. For the sake of surgical planning, operations were classified as: major (long/complex procedures requiring general/spinal anesthesia); intermediate (small procedures requiring general/spinal anesthesia); and minor (procedures under local anesthesia). Activities were organized as shown in Table III. Major procedures were concentrated in the first of the two operative weeks to allow visiting surgeons the longest possible follow-up.

All operations were performed in the main operating theatre with a Kenyan nurse anesthetist present for all procedures except for the minor ones. The operating room/theatre was equipped with an anesthesia cart. General anesthesia was achieved using atropine as pre-medication, thiopental and succinylcholine for induction, and desflurane for maintenance. Lidocaine was used for spinal and regional anesthesia. Materials being re-used included endotracheal tubes, ventilator tubing, respiratory bags, cautery pens, closed-suction drains, drapes and vests. Gloves and gauzes were disposable. Petroleum gauze dressing was prepared by nurses on a weekly basis. The hospital could not afford advanced wound dressings (hydrocolloids, alginates, gels and foams) and these were only occasionally available thanks to public and private donations.

The breakdown of surgical activity for the four blocks is shown in Fig. 3. The patient population consisted of 67 (63.2%) males and 39 (36.8%) females with an average age of 31.6 ± 20.8 years (age range 7 months - 65 years). Most of the patients (73.6%) underwent a single surgical procedure but a

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### Table II - Aims of the project

<table>
<thead>
<tr>
<th>Aims of the project</th>
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<tbody>
<tr>
<td>Ameliorating the ongoing screening and selection of patients eligible for plastic reconstructive surgery</td>
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<tr>
<td>Improving postoperative and long-term surveillance of patients operated within plastic surgery missions</td>
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<tr>
<td>Increasing awareness of plastic surgery services among the local population</td>
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<td>Enhancing activity planning</td>
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<tr>
<td>Monitoring local resources</td>
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</tbody>
</table>

### Table III - Organization of activities within a plastic surgery block

<table>
<thead>
<tr>
<th>Day</th>
<th>Event</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 7</td>
<td>Team gathering</td>
<td>Staff meeting and team activity</td>
</tr>
<tr>
<td></td>
<td>Screening</td>
<td>Clinical examinations</td>
</tr>
<tr>
<td></td>
<td>Scheduling</td>
<td>Surgical schedule</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operating room preparation</td>
</tr>
<tr>
<td>8 - 14</td>
<td>Surgery</td>
<td>Major operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intermediate operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postoperative care</td>
</tr>
<tr>
<td>15 - 21</td>
<td>Surgery</td>
<td>Intermediate operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minor operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postoperative care</td>
</tr>
<tr>
<td></td>
<td>Debriefing</td>
<td>Postoperative instructions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Planning of future cases</td>
</tr>
</tbody>
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Fig. 3 - Graphical representation of plastic reconstructive surgery activity within the mission period.

Fig. 4 - Surgical activity organized by plastic surgery subspecialty, type of operation performed and anatomical area.
considerable percentage (35.8%) was operated on multiple sites. Operations under general and spinal anesthesia made up the majority (73.1%) of the recorded cases. Fig. 4 shows the surgical activity organized by plastic surgery subspecialty, anatomical area and type of operation performed. Correction of post-burn contractures and reconstruction of soft tissue defects accounted for the greatest part of the surgical activity (72.8% of operations) and also for the most complex procedures (microsurgical reconstruction with free anterolateral thigh flap). Congenital defects were camptodactyly (5 patients – all involving 5th finger bilaterally), amniotic band syndrome (1 patient with bilateral hands, 1 with bilateral feet), incomplete separation of the superior helix of the auricle from the adjoining scalp (1 patient), and a disfiguring case of Von Recklinghausen’s disease (Fig. 5).

Four patients required revision under general anesthesia to correct complications (1 thrombosis of venous anastomosis; 1 complete wound dehiscence; 1 failure to correct congenital camptodactyly; 1 complete failure of skin graft). Outcomes in the patient population are reported in Table IV. Length of hospital stay ranged from 1 to 22 days (average 12.3 ± 6.9 days). In a population with few wound care resources available outside the hospital setting, sometimes not even clean water, patients were typically kept in until their wounds had nearly healed. After discharge they were either scheduled for follow up as outpatients or referred to the nearest healthcare facility to continue care. Patients with post-burn contractures to the upper or lower limb limiting function were managed alongside the in-house physical therapist. A plaster slab was provided when needed and patients were followed up with an extensive physiotherapy programme.

The author spent the weeks between subsequent blocks following up on operated patients, visiting local dispensaries to increase awareness of the plastic surgery service among the district’s population, and assisting the in-house general surgeon and gynaecologic surgeon. The most common operations performed in this time frame consisted of caesarean section (43%), hernia repair (27%) and hysterectomy (12%). Out of a total of 24 weeks, approximately 22 were spent at the hospital.

**Discussion**

In 1850 there were about a dozen medical missionaries worldwide. These solitary pioneers, most frequently driven by faith, were progressively substituted by physicians trained in

<table>
<thead>
<tr>
<th>Outcome</th>
<th>%</th>
<th>Event</th>
</tr>
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<tbody>
<tr>
<td>Mortality</td>
<td>0.9</td>
<td>Anesthesia complication</td>
</tr>
<tr>
<td>Significant morbidity</td>
<td>6.6</td>
<td>Blood loss requiring transfusion</td>
</tr>
<tr>
<td></td>
<td>3.8</td>
<td>Complications requiring major surgical revision</td>
</tr>
<tr>
<td>Minor morbidity</td>
<td>19.8</td>
<td>Wound partial dehiscence or delayed healing managed conservatively</td>
</tr>
<tr>
<td></td>
<td>16.3</td>
<td>Local infection</td>
</tr>
</tbody>
</table>

America and Europe, until medical humanitarian work was established with the creation of the World Health Organization (WHO) in 1945. Over the following 50 years, health conditions in the developing world improved considerably. Nevertheless, therapeutic services from developed nations still have an enormous part to play, as the supply barely meets the demand for aid and assistance in every region of the globe.

Surgical missions are mostly structured as a “one-off” short-term visit lasting on average two weeks. The therapeutic activity is performed in an “intensive and packed” modality, with postoperative care and events such as complications left to the local physicians to manage. This remains the most established model in the humanitarian mission scenario for a number of different reasons, including the fact that people are more willing to volunteer for a short time frame. Nevertheless, such a health intervention is far from ideal, especially regarding safety and efficacy of treatment. Government agencies, private foundations and corporations, and international development organizations have all directed substantial effort into developing alternatives. An unexpected resource in this pursuit came from the figure of resident trainees.

The surge in interest for international training and experience was first reported by a national survey of American College of Surgeons resident members. Ninety-two percent of the 724 respondents in the survey were interested in an international elective, and 82 percent would prioritize the experience over other electives. Multiple institutions now regularly participate in organized international mission trips and allow residents to attend newly created international health electives as a response to this increased interest. Willingness to take a long leave of absence together with the thrust towards improve-
ment and challenge make residents the perfect candidates for such experiences. Reports carry further evidence of professional and personal rewards, increase in surgical skills and confidence, enhancement of sensitivity to cost issues, less reliance on technology, and greater appreciation for cross-cultural communication.4,7,8

International electives are formally classified as short-term medical missions (less than 2 years in length). The peculiarities of such programmes can be highlighted as follows: a) they are usually set in a structured hospital-based context so as to provide adequate exposure to practical experience, especially for surgical trainees; b) the resident is mentored by a western-trained physician with no language barrier in order to achieve optimum teaching and learning; c) no equivalent professional figure (resident trainee) is present; d) the lack of most surgical specialists may challenge the residents to learn about procedures outside their specialty; e) practical experience takes place in a functional but underserved context, forcing the trainee to reconfigure a consolidated practice setting. The experience reported by the author featured all of the above-mentioned aspects and adhered to consensus guidelines published to ensure ethical standards and surgical safety on volunteer missions.9 However, some unique and previously unreported peculiarities emerge.

• Surgical volunteerism was specific to plastic surgery, becoming in this way an official part of the residency training. Taking into account the operative records, the trainee had the possibility to perform a large volume of operations in a relatively short period of time. Also, a number of cases were highly complex, being either multiple or neglected, and were scenarios a western trainee might otherwise never come in contact with.
• All cases, including microsurgical reconstruction, were carried out by a surgical team made up of the visiting senior and the author only.
• Partnering with different specialists led to a fruitful acquisition of new skills and knowledge.
• The long stay made it possible to monitor patients for up to six months, allowing follow up until healing was complete, supervision of physical therapy and management of late complications (both independently and under the supervision of the in-house general surgeon for more complex cases).
• The weeks of absence from specialty activities was an opportunity for the author to expand her surgical knowledge and learn to perform operations outside her field of specialty, such as a caesarean section. Such an experience transcends critics in the academic community who frequently argue that international missions are prone to sub-standard care, lack of follow up, and subsequent complications managed by local physicians alone.

The benefits that the continuous presence of a western trainee has had for the local community have been evident in many ways. One issue that was observed during the first weeks at North Kinangop was the absolute lack of information on which services plastic surgery could offer to locals. Although this might sound surprising, one should keep in mind the rural context with a mostly poorly-educated population. Plastic surgery is practiced by approximately ten specialists throughout the country at outrageous costs, and common people have no chance of becoming familiar with reconstructive surgery. Creating a reference figure who could spread knowledge and gain trust led to a +500% increase in requests for plastic surgery consultations from the first to the last operative block. Communication and integration with the local community and hospital personnel was fundamental to the success of the program. The evaluation of cultural differences and proper coordination with local counterparts, not only medical professionals or other supporting staff but also social, religious and political referents, laid the foundations for an efficient long-term sustainable project.

Conclusion

Structured humanitarian medical missions can play a significant role in residents’ education. The setting allows for maximal exposure and learning due to the concomitant absence of other trainees, and the surgical cases can count towards the residency program log of operations. The inherent commitment to caring for underserved populations cultivated during an international surgical mission trip in residency most likely translates into continued dedication in postgraduate physician practice.9 Keys to a successful international volunteer programme for surgical trainees include structure, oversight and partnership with established organizations with proven records of providing care with the highest medical and ethical standards.9

BIBLIOGRAPHY


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