

# Multicenter plastic surgery outreach services for underserved Ghanaian communities

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**Abstract** This paper describes the efforts of one plastic surgery team composed of Ghanaians from one of the major metropolitan areas in Ghana to meet the plastic surgery needs of rural Ghanaian communities. The aim was to analyze retrospectively the cases managed by the team, the difficulties which arose over a 14-year period, and the provision of recommendations for such future work. This study reviewed the medical records of patients treated during 86 outreach visits to nine centers from October 1995 to September 2009. The team, drawn from three hospitals, comprised a plastic surgeon and surgical support staff. They mostly treated Buruli ulcers, postburns scar contractures, chronic ulcers, facial clefts, tumors, and breast diseases. In all, 2,284 patients were managed during the period under review, giving an average of 163 patients per year and 254 per center. Buruli ulcers accounted for the largest group of cases treated during the outreaches (41%). Other common diagnoses were postburn scar contractures and cleft lip and palate deformities. This paper provides an example of

the possibilities for surgical outreach work that exist and how challenges that come up during surgical outreach visits can be handled effectively. It also highlights the need for outreach medical work in developing countries like Ghana, especially since there is a reduction in foreign outreach medical missions. The authors encourage all stakeholders involved in health care delivery to initiate and support local medical outreach teams to provide care to rural communities.

**Keywords** Burns reconstruction · Buruli ulcer · Cleft lip/palate · Breast diseases · Outreach

## Introduction

Ghana's two main teaching hospitals are the country's main sources of specialized medical and surgical services, including Acute Burns and Intensive Care units. These hospitals are

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located in the two largest cities in Ghana: Accra and Kumasi. Patients living outside the urban areas of Accra and Kumasi have difficulties accessing these services as challenges with transportation and accommodation in these areas may put these services out of an individual's reach. In addition, these urban centers may be difficult to negotiate for people used to rural areas, and in some cases, people may not seek treatment for fear of discrimination.

There has been, and remains, a great need for surgical outreach to less endowed areas in Ghana [1, 2]. Foreign surgical outreach groups such as Interplast and Operation Smile have come to Ghana to do surgical work or give free surgical services. These outreaches have been immensely helpful to the Ghanaian people in the villages that would otherwise not have had surgical care. However, there still exists a need for surgical services among the rural dwellers of Ghana.

While foreign outreach surgical teams have assisted, another way to address the need for more surgical care to rural Ghana is to have outreach teams consisting of local physicians practicing in the more metropolitan areas of Ghana. Outreach teams composed of domestic citizens have several advantages over teams composed solely of foreigners. Other authors coming from outside developing countries to do outreach work have cited cultural and language barriers as challenges facing them and the work they do. Additionally, local physicians may have connections with some physicians, other health care workers, and community leaders in rural areas where outreach work is needed [3].

A good working relationship with the indigenous community is essential for best patient outcomes in successful, productive outreach missions. Local physicians may be more familiar with the equipment available for use at the outreach hospitals. Domestic physicians' knowledge of the local language allows for better communication with patients and with local health care providers, thereby making it easier for outreach personnel to educate both the patients and the local health care staff. There is also the possibility, with domestic outreach physicians, for at least some members of the team to stay for a few days to 1 week after surgery to handle postsurgical complications [4, 5].

Although health care resources in Ghana and other developing countries are limited, outreach from domestic physicians may be a better mobilization of resources and address the specific needs of the community. For example, a lot of money is saved because it takes less time and expense to travel to the outreach sites. Closer proximity to these areas also makes patient follow-up easier and more effective.

#### Buruli ulcer surgery

Buruli ulcer is a common condition requiring plastic and reconstructive surgery. It is a chronic, indolent, necrotizing

disease of the skin caused by *Mycobacterium ulcerans* [6]. It starts as a painless, often itchy, nodule on the skin and progresses to massive ulceration, sometimes destroying bones and resulting in debilitating complications and, consequently, leading to deformities, functional disabilities, and amputations if patients do not report early for treatment [7–9].

Based on the work of the Ugandan Buruli Group, three clinical stages of Buruli ulcer disease have been described: a preulcerative stage, an ulcerative stage, and a healing stage [6, 10]. Buruli ulcer is a relatively common condition in Ghana. The results of a national case search for patients with Buruli ulcer in Ghana estimated prevalence of active lesions to be 20.7–150.8 per 100,000 people, depending on the geographical region [8, 11]. The unfortunate thing about the disease is its predilection for children [8].

Treatment of Buruli ulcer may necessitate long hospitalization and is quite expensive. It is therefore not surprising that patients are reluctant to seek treatment outside their own respective communities [12]. The high total direct cost of treating Buruli ulcer patients could be reduced by early presentation and early treatment, which would have an additional advantage of reducing the occurrence of complications such as muscle contractures limiting joint mobility, deformities, functional disabilities, and amputations. This is made possible by the organization of surgical outreaches to these underserved areas.

#### Postburns reconstruction

One of the main areas requiring specialist plastic and reconstructive surgical attention is in the management of postburns scars. In Ghana alone, there are approximately 1,500 severe burns cases annually, with about 600 of these patients requiring hospitalization [13]. Many of these patients require reconstructive plastic surgery after the wounds heal in order to release postburns scar contractures [13]. Left untreated, these contractures leave the function of burned limbs, joints, and/or fingers impaired. For burn injuries in general, it has been reported by different studies in many countries that children are the most reported burn victims [14–19].

#### Cleft lip and palate deformities

With approximately 680,000 births in Ghana each year, there are between 683 and 1,366 babies born with cleft lip or palate. This prevalence has been found to be very high in some areas. For instance, Wudoaba, in the southeastern part of Ghana, has been described as a cleft-endemic community [20] and also an ongoing research by this outreach team has so far shown approximately 25 clefts per 4,000 people.

## Breast diseases

Developmental or anatomical anomalies with the breast comprise another major area which requires specialist plastic and reconstructive surgery care [21]. They are relatively common and may occur as a result of developmental anomaly and trauma or as a complication of treatment for breast diseases especially breast cancer. Breast anomalies occur almost exclusively in females, with presentation varying from infancy through early adulthood. Breast developmental anomalies are varied and may include amastia, hypoplasia, accessory breast, tubular breast, nipple anomalies, and hyperplasia/macromastia [21].

Though demand for specialized medical care in rural Ghana remains high, surgical outreach work serving these regions may be on the decline. Reasons for the decline may be associated with the reluctance of local physicians and other health workers to sacrifice themselves under harsh living conditions in these villages, since they cater for themselves financially. In addition, foreign aid to support the outreach was also not enough to cater for larger groups of people who needed health care. Challenges that may impede more physicians and other health care providers from doing more outreach work should be investigated and addressed if this need is to be met [3, 22]. All possible ways to increase availability of and access to health care, particularly surgical services, to rural parts of Ghana should be investigated.

While outreach missions from foreign physicians and other health care workers help to fill this need, local physicians and surgeons may represent untapped potential in terms of outreach work to rural areas [5]. If knowledge of this model of outreach work was more widespread among physicians in developing countries, if a more formal system of domestic outreach work was in place, and if funding and other resources were made available to physicians and surgeons from within developing countries who wanted to do outreach medical work in rural areas of their home countries, these could improve access to medical care in these communities [23]. The present paper describes the outreach efforts of one plastic surgery team to provide treatment to patients with Buruli ulcers, postburns scar contractures, cleft lip and palate malformations, and breast diseases and other patients in need of reconstructive surgery.

## Materials and methods

This study reviewed the medical records of patients treated during outreach visits made by the reconstructive plastic surgery team from October 1995 to September 2009. Data were collected primarily from a review of patients' records. The sex, age, and diagnoses of all cases managed were

recorded and presented in tables and graphs by using SPSS 17.0 for Windows (SPSS, Inc., Chicago, IL, USA).

The outreach team drew specialists from the Global Evangelical Mission Hospital at Apromase, near Kumasi, the Komfo Anokye Teaching Hospital of the Kwame Nkrumah University of Science and Technology in Kumasi, and the Presbyterian Hospital at Agogo. The team comprised a plastic surgeon (the main/corresponding author), a surgical resident, two anesthetists, two perioperative nurses, a health educator/public relations officer, and one logistics coordinator.

The greatest number of patients was treated at the Global Evangelical Mission Hospital, the hospital closest to Kumasi where a majority of the team members usually practice. The team therefore was able to move easily to this center, hence the large number of visits and equally a large number of patients treated.

During the period under study, the team treated patients at nine medical centers, making a total of 86 outreach visits to the Ashanti, Greater Accra, and Volta Regions, whose distribution is shown in Table 1. Conditions treated during the period under study included: Buruli ulcers, postburns scar contractures, chronic ulcers, cleft lip and palate, tumors, and breast diseases.

## Types of surgical treatments

*Buruli ulcers:* excision/shaving and skin grafting

*Postburns scar contractures:* release of contractures with z-plasty and/or skin grafting

*Chronic ulcers:* excisional debridement and wound dressing and/or shaving and skin grafting

*Cleft lip and palate:* repair in all cases except the adult palate clefts. In children with both lip and palate clefts, the cleft lips were done first, and then in subsequent visits, the palate clefts were done usually around the age of 2 years

*Tumors:* excisional biopsy

*Breast diseases:* excisional biopsy for breast lumps, keloids, accessory breasts

## Results

### Patient distribution

In all, 2,284 patients were managed at the nine medical centers, and the number of patients treated at each of the centers is provided in Table 1.

### Sex distribution

Table 2 gives a presentation of the male-to-female ratio of patients treated at each of the institutions. In most locations,

**Table 1** Outreach centers visited with respective numbers of visits and patients treated

Health facility	Town	Number of visits	Number of patients treated
Global Evangelical Mission Hospital	Apromase	58	1,275
Nkawie Government Hospital	Nkawie	4	262
Nyinahin Government Hospital	Nyinahin	2	80
Seventh Day Adventist Hospital	Asamang	2	58
Bekwai District Hospital	Bekwai	4	117
Amasaman District Hospital	Amasaman	2	47
Comboni Catholic Hospital	Sogakope	1	24
Abor Catholic Hospital	Abor	1	16
South Tongu District Hospital	Sogakope	12	405

Source: field data, 1995–2009

more males than females sought treatment from the team. The total male-to-female ratio of all patients treated was 1.2:1.

### Age distribution

The age distribution for all patients treated is provided in Fig. 1, with the majority of patients seeking treatment being 30 years of age or younger. More than 75% of all patients treated were between the ages of 11 and 30.

## Diagnoses

### Buruli ulcers

As seen from Fig. 2, Buruli ulcers accounted for the largest group of cases treated, amounting to 41% of all patients. Of these, 65% of all cases were located on the lower limbs, 60% of all treated were males, and 70% were children up to 14 years. The study found a male-to-female ratio 1.3: 1. In terms of affected body parts, 61% of the Buruli ulcer patients

**Table 2** Male-to-female ratio of all patients treated during outreach visits

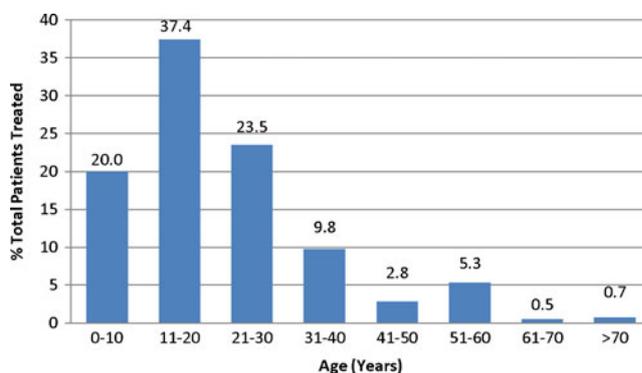
Health facility	Male/female
Global Evangelical Mission Hospital	1.4
Nkwawie District Hospital	1.4
Nyinahin District Hospital	1.1
Seventh Day Adventist Hospital	1.2
Bekwai District Hospital	1.4
Amasaman District Hospital	0.8
Comboni Catholic Hospital	0.8
Abor Catholic Hospital	3.0
South Tongu District Hospital	0.8
Overall	1.2

Source: field data, 1995–2009

were affected at the lower limbs, 18% at the upper limbs, 9% at the trunk region, 9% at the head and neck region, and 3% at the perineum. Table 3 and Fig. 3 give the details of the Buruli ulcer cases found among patients. Images of Buruli ulcer are shown in Images 1 to 5.

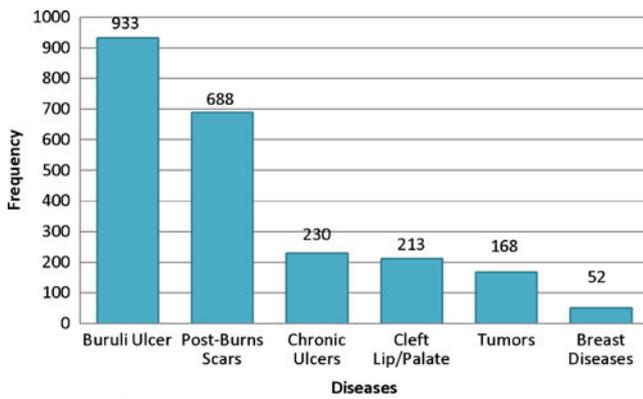
### Postburns reconstruction

Patients were treated for postburn scar contractures at each of the medical centers except Nyinahin, where notably only Buruli ulcers were treated. Figure 2 shows the frequency of each diagnosis treated; 688 (30%) of the 2,284 patients were treated for postburn scar contractures, making it the second most prevalent diagnosis treated. Table 4 gives the distribution of cases per center. Global Evangelical Mission Hospital and the South Tongu District Hospital were the two treatment centers from which the largest number of patients was treated for postburn scar contractures. The age distribution of patients treated for postburn scar contractures is provided in Fig. 4. Approximately half of these patients were 30 years of age or younger, with nearly 30% of patients between the ages of 21 and 30. The results of the study in terms of postburn scars among the patients reveal that upper limbs were the



Source: Field data, 1995–2009

**Fig. 1** Age distribution for all patients treated by the outreach team



Source: Field data, 1995- 2009

**Fig. 2** Diagnoses treated by the reconstructive plastic surgery outreach team

most common site of postburn scar contractures, affecting about 61% of this patient population. Other body parts such as lower limbs, head and neck region, trunk, and perineum were recorded as 24%, 8%, 6%, and 1%, respectively

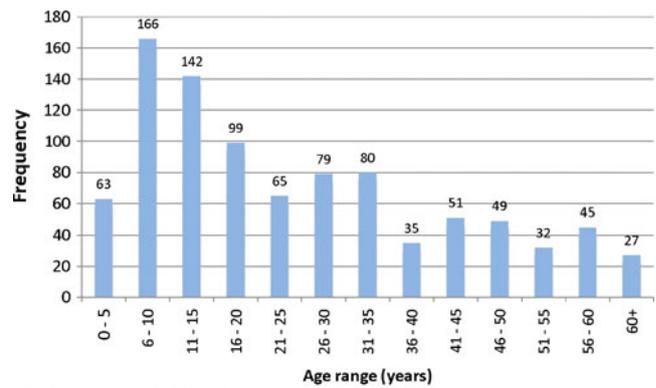
### Cleft lip and palate

This condition accounted for 9% ( $n=213$ ) of all treated patients. Even though this was a small number, this group posed special problems because of the high level of expertise needed for their surgeries. Additionally, most of them were treated at the South Tongu District, presenting a further traveling distance for the team. Most of these patients came from a cluster of villages in the southeast part of Ghana. Also, 59%, 26%, and 15% of the cleft patients had isolated cleft lip, combined cleft lip/palate, and isolated cleft palate, respectively, while unilateral and bilateral clefts recorded were 75% and 25%, respectively. Figure 5 gives the age distribution of all cleft deformities managed.

**Table 3** Buruli ulcer cases per health facility

Medical center	Frequency
Global Evangelical Mission Hospital	616
Nkwawie District Hospital	112
Nyinahin District Hospital	80
Seventh Day Adventist Hospital	34
Bekwai District Hospital	63
Amasaman District Hospital	22
Comboni Catholic Hospital	1
Abor Catholic Hospital	1
South Tongu District Hospital	4
Total	933

Source: field data, 1995–2009



Source: Field data, 1995- 2009

**Fig. 3** Age distribution of patients treated for Buruli ulcer

## Discussion

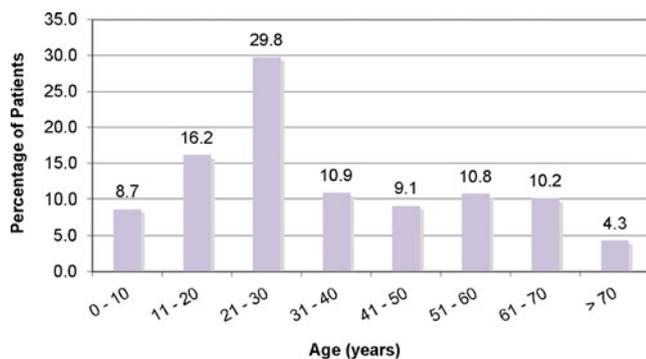
This paper describes efforts made to bring specialist medical care to underserved patient populations in Ghana. Many village dwellers are generally without access to the specialist services available at the Komfo Anokye and Korle-Bu Teaching Hospitals due mostly to financial constraints, challenges with long-distance travel, and problems negotiating transportation and accommodation in Kumasi and Accra.

In this study, more males than females were treated. The number of males slightly outnumbered the females in the burns treatment group (male/female = 1.1:1), perhaps lending support to the hypothesis that more males than females sustain burns and other traumatic injuries. One possible explanation for this is that the conditions treated tend to affect more males than females, particularly if they were accident-related. For example, in the case of postburn scar contractures, the higher male-to-female ratio may be because males are more likely to engage in risky behavior, putting themselves at an increased risk for burns and other traumatic injuries. It may also be possible that more

**Table 4** Number of patients treated for postburns scar contractures at each outreach site

Medical center	Frequency
Global Evangelical Mission Hospital	386
Nkwawie District Hospital	15
Nyinahin District Hospital	0
Seventh Day Adventist Hospital	2
Bekwai District Hospital	4
Amasaman District Hospital	2
Comboni Catholic Hospital	1
Abor Catholic Hospital	1
South Tongu District Hospital	277
Total	688

Source: field data, 1995–2009

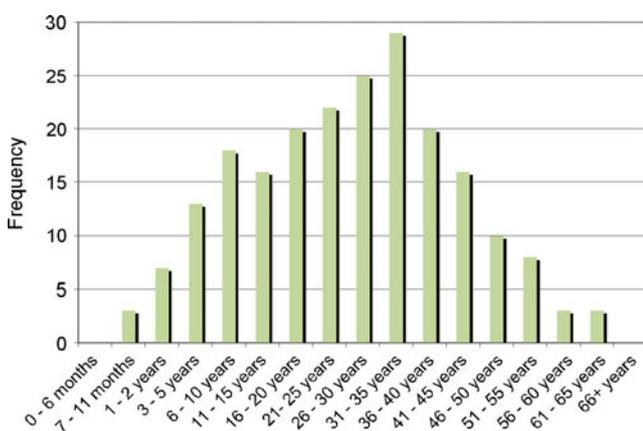


Source: Field data, 1995-2009

**Fig. 4** Age distribution of patients treated for postburns scar contractures

males than females sought treatment from the team because the males were better informed about upcoming outreach visits and/or were able to arrange travel and time away from commitments to have surgery. Also, the females might be attached to their children and so were not able to easily move to the treatment centers.

There are certain unique practical considerations for delivering specialized medical care to rural communities in the developing world. Outlining how this outreach team handled these aspects may be helpful to groups interested in doing similar work in the future. Benefits that were derived from the outreach includes absolutely free treatment for patients, local health workers were equipped to handle cases that initially posed greater problems to them especially BU, and foreign medical specialists who were unsure of the language and culture of the people also benefited by understanding the norms, beliefs, and cultural values of the local folks. To minimize postoperative complications during the outreach programs, the best patients were selected and treated. Those suspected to cause postoperative complication management difficulties were brought along to either of the teaching



Source: Field data, 1995-2009

**Fig. 5** Age distribution of patients with cleft lip or palate deformities

hospitals and put under close surveillance for effective postoperative complication management. As can be envisaged, there were several challenges that had to be overcome in order to make each outreach work successful. These challenges included funding of the outreach, publicity, patient selection and training of local staff upon arrival of the team, and prevention and management of postsurgical complications.

The first concern was financial. Money was needed for publicity purposes; to buy and maintain surgical input in the form of equipment, instruments, and other surgical materials; to transport the team in and around the locations; to board, and motivate the team. The main author, in consultation with other team members, decided to donate their services and thus provided surgical care without support. Occasional donations of meals and other services for the team were also made. For example, when the team got to a particular town, a prominent person in that town provided lunch for the team for 2 days. Most of the time, however, the cost of surgery was borne by the team members and the hosting institutions. Within the last 2 years of the review period, the South Tongu District Hospital at Sogakope provided lunch for the team and the local operating theater staff.

A second challenge was publicity. Each outreach community had to be given prior notification in order to make sure potential patients knew about the surgical team's visit ahead of time. This was effectively done through local radio broadcasts and announcements by community leaders such as church ministers, chiefs, local physicians, and school administrators among others. Other approaches employed included house-to-house visitations of the team to communities with high prevalence of some of the common conditions. Education of the community members was done with sample pretreatment and posttreatment photos to encourage potential patients to come out openly for treatment. The widespread education campaigns conducted by the team in the communities coupled with teaching sessions in the hospitals on the various surgical conditions treated this also helped, in some instances, to remove stigmas associated with certain conditions, like the cleft lip and palate deformities.

There were often many more patients who came for treatment than could be treated by the team during each outreach visit. Therefore, another challenge handled by the team was selecting which patients would undergo operation. Among the group of patients presenting for treatment, some had very serious conditions requiring complex procedures and others had conditions that could be treated relatively easily. The team reviewed each patient who requested an operation and then decided whether to perform the surgery, refer the patient to a local physician for treatment, or refer the patient to a tertiary hospital for more intensive treatment.

Since reconstructive plastic surgeries were not routinely performed at many of the hospital outreach sites, there was

some concern that the local hospital staff would not be equipped with the nursing skills necessary to care for these patients during and after surgery. The surgical outreach team used this opportunity to train the local staff to assist with the operations, provide postoperative care, and successfully handle postsurgical complications.

Prevention of postsurgical complications is one of the top priorities for surgical teams everywhere. For this outreach team, efforts to prevent complications began with choosing to operate only on patients who were generally healthy aside from having the condition (e.g., postburn scar contractures) requiring reconstructive plastic surgery. In addition, advanced planning was needed to ensure that the operating theaters in the outreach sites were prepared with all needed equipment and that the instruments and supplies were sterile and in good working condition. In most cases, the team members brought surgical instruments and tools to the outreach site. Finally, efforts were also made to reduce the length of surgery and, consequently, the risk of patient infection.

## Conclusion

This paper highlights the need for outreach medical work; both because the need for such services in Ghana is great and the foreign outreach medical missions have decreased in number in recent decades. Here, authors have highlighted some of the challenges that arise when planning and carrying out surgical outreach clinics and the ways in which the main author and his colleagues have addressed them. More medical teams, composed of foreigners, Ghanaians, or a combination of both, are needed to address the need for specialized medical services in Ghanaian villages.

This paper provides an example of the possibilities for surgical outreach work that exist and how challenges that come up during surgical outreach visits can be handled effectively.

There is a great need for more surgical outreach work in Ghana and in other parts of the developing world to treat Buruli ulcers and a range of other conditions.

## Recommendations

More local specialists in developing countries should form outreach teams to help in the provision of specialized medical care to rural communities. To make these outreaches effective, the receiving health facilities should also provide some logistic support to the outreach teams. Other foreign medical outreach program facilitators from Europe,

the USA, and other places should support the activities of local medical outreach teams in terms of finances, logistics, and personnel for the sustenance and extensions of this medical outreach to other needed parts of the country.

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