CASE STUDY

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Treatment needs and surgical intervention outcomes in children with oral clefts managed in the region of Geita, Tanzania, East Africa

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Abstract

Introduction and Objective. The humanitarian mission carried out in the Geita region of Tanzania revealed the tremendous healthcare needs of the local population, particularly in the treatment of congenital craniofacial anomalies.

Materials and Method. This is a retrospective study of the medical records from patients operated on during four humanitarian missions to the Geita region of Tanzania, East Africa.

Results. During four missions, 58 children underwent medical examination. Surgical treatment was performed in 52 patients. Of these, 15 children were operated on for oralfacial cleft (OFC).

Conclusions. This experience clearly demonstrates that even a single, well-prepared surgical mission can substantially improve the access to specialized care in low-resource settings. Reconstructive surgery not only restores children's physical function and their health, but also their dignity, allowing them to reintegrate into their family life, pursue education, and develop normally among their peers.

Key words

congenital anomalies, reconstructive surgical procedures, orofacial clefts

INTRODUCTION

Orofacial cleft (OFC) are the most common craniofacial defects. In the last several decades (1990 – 2019), the number of OFC cases reported worldwide has decreased by 19%. However, the number of cases documented in Eastern Sub-Saharan Africa is increasing [1, 2]. The main reasons for this trend may include the improvements in birth registration in African countries [3,4], the regional retrospective analyses of OFC cases [5–7], and the international medical aid [8,9]. There is some data suggesting that the prevalence of OFCs in Africa is underestimated [4]. The lowest frequency in the East Sub-Saharan region is reported in Malawi [5]. The data regarding OFCs in Tanzania remain limited [7]. The total population of Tanzania is 61,741,120 whereas the Geita region has a population of 2,977,608 (2022 data). According to some studies, the prevalence of OFC's in the Tanzanian population is approximately 2.8% [5,6]. The most common cleft type observed in Tanzania is the isolated cleft lip. The isolated cleft palate is less frequently treated surgically, which may be related to the higher mortality rates in this group of children [6].

The constraints of hospital infrastructure and widespread poverty in many regions of Sub-Saharan Africa [10], as well as cultural barriers, may represent the most significant challenges in OFC management in Tanzania. One of the main reasons of the OFCs reported in the epidemiological studies are the maternal factors and complications during pregnancy, such as malnutrition, low folic acid intake and alcohol history. Also some pollution and environmental factors from mining districts may increase the risk of OFCs [4].

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OBJECTIVE

The aim of this study is to present the treatment needs and the surgical intervention outcomes based on the experience of a solo medical mission carried out by a paediatric and plastic surgeon in the Geita region of Tanzania, East Africa.

MATERIALS AND METHOD

This is a retrospective study of medical records from patients operated on during humanitarian missions to the Geita region of Tanzania, at the zonal referral hospital at the district level [11]. Four missions were conducted between 2023 – 2024, each lasting 2 – 4weeks, for a total of 12 weeks of patient care.

Ethical statement. The study was performed in accordance with the Declaration of Helsinki. All participants gave their consent to participate. The study protocol was approved by Hospital Board, Catholic Diocese of Kahama, San Pio Hospital, No. 1/2024. The participants who were under the age of 16 required written consent from their parents or legal guardian.

Hospital facilities. The humanitarian missions were not founded by any organization. All the costs were covered from

a personal budget. The hospital, where missions took place, has a women's ward and a men's ward, as well as an expanded maternity ward. In recent years, a laboratory, a paediatric ward, and a neonatal ward have been established. As the operating theatre was not equipped to operate on children, the Polish team brought some surgical instruments with them, as well as necessary disposable equipment (including anaesthesia: e.g., endotracheal tubes, masks, paediatric ambu bags, etc.). Some dressing materials (gauze pads, bandages, plasters, steristrips, etc.), disinfectants, ointments, and some medications intended for children, were also provided.

Surgery qualification. Traditional qualifications were not About two months before the specialist's visit, the hospital's director ran an informational campaign which included posting banners in places where many people gather, such as markets and churches. Text message notifications were sent and hospital employees passed on information verbally. Thanks to the close collaboration between the director of the hospital and a local non-governmental organization (NGO), it was possible to reach patients in some very remote areas where the medical infrastructure is often completely lacking. This cooperation enabled the identification of children with congenital craniofacial defects who, under other circumstances, would have remained beyond the reach of any surgical care.

On the way from the airport to the hospital, the Polish surgeon stopped to examine children with congenital defects and decided whether they were suitable for the surgery. Some children came to the clinic at the hospital for the first visit, during which the parents were interviewed by the Polish surgeon. The children were examined and qualified for surgery. The conversations were interpreted by local doctors who spoke Swahili or Sukuma and not English While some children were admitted to the hospital immediately, others were not. Sometimes, the mothers took their children home in order to consult their treatment with their husbands and a local shaman. Most of them returned and decided to have their child operated on.

The hospital also provides dental consultations once a week although there are no orthodontists. Therefore, any orthodontist's consultation took place prior to the surgery, and the only laboratory tests that could be performed before the surgery were blood count and blood type.

Surgical technique. All children underwent a general anaesthesia with peroral intubation. In cases of a cleft palate repair, a reinforced endotracheal tube was used. A local anaesthesia was administered in every case using 1% lignocaine with adrenaline at a concentration of 1:200,000. All children received a second-generation cephalosporin as perioperative prophylaxis (1 dose before operation and then 3 days post-operation). For the cases of cleft lip, a unilateral lip reconstruction was performed using the Tennison-Randall technique (triangular flaps taken from the lower one-third of the lip) [Fig. 1].

For cleft palate surgery, a modified Langenbeck technique was used [Fig. 2]. The aberrant attachments of the palatine muscles to the bone were separated, and mucoperiosteal flaps were elevated from the nasal and oral cavities. The vascular bundles required extensive dissection. The nasal mucosa and the aberrant muscle attachments were divided transversely, which produced a significant widening of the palate. To reduce the tension from the palatine tensor muscles, the hooks of the pterygoid processes were severed. The layers of the palate were then closed in the midline, and the mucosa was sutured along the lateral incisions. Most of the controls were by the way of vaccinations or other medical interventions.

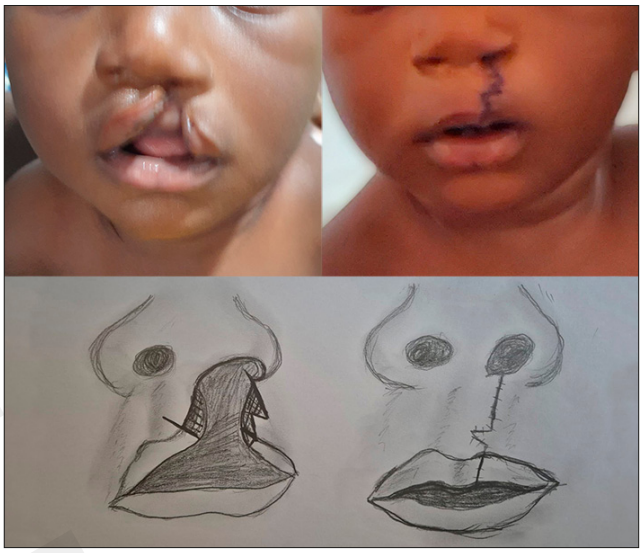

Figure 1. The Tennison-Randall technique, reconstruction of right-sided cleft lip

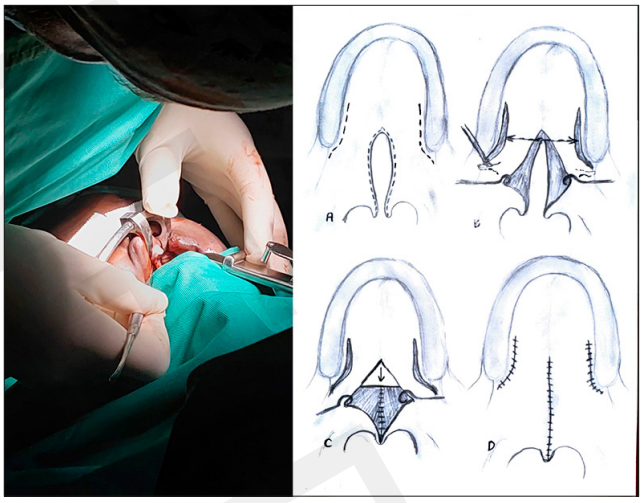

Figure 2. Surgery of cleft palate, modified Langenbeck technique

Only ibuprofen and paracetamol were used in the post-operative course due to the lack of opioids in this region. Children who underwent a cleft lip repair were monitored in the post-operative room for approximately four hours, whereas those who had cleft palate surgery were observed until the following morning.

Initially, non-dissolvable stitches were used on the skin which were removed after seven days. Children stayed at the hospital until removal of the stitches. Later, a surgeon began using dissolvable stitches because some children who lived far away found it difficult to arrange a follow-up appointment after a week. On discharge of the children, every mother was instructed on how to massage the scar, and received Vaseline, a healing, moisturising jelly, from the doctor. The follow-up period ranged from 6–48 months. Telemedicine was used and the surgeon from Poland performed consultations on the basis of photos.

Figure 3. Right-sided clef lip

Figure 4. Left-sided cleft lip

Figure 5. Unilateral cleft lip and palate

Figure 6. Bilateral cleft lip and palate

RESULTS

During the mission, 70 children were registered for their first medical appointment. Of these, 58 children underwent medical examination. One child was disqualified from surgery due to severe malnutrition, one set of parents did not consent to surgery, and four children with cleft lip and palate were considered too young. Surgical treatment was performed in 52 patients (18 girls and 33 boys) (Tab. 1). Of these, 15 children were operated on for OFCs (Tab. 2). The mean age of the operated children with OFCs was 15 months (range: 1–82 months).

No severe complications (infections, healing problems) were reported in the early post-operative period. During the two-year follow-up, one child died due to malnutrition and dehydration. The most frequent performed procedure was unilateral lip reconstruction, accounting for 46% of all surgeries [Fig. 2, 3]. Unilateral clefts (70%) were more common than bilateral clefts (30%) [Fig. 4–6].

Table 1. Characteristics of the operations performed during the humanitarian mission

Type of surgery	Number of cases	Age–mean (min–max)	Sex (F/M)	Duration of surgery – minutes (mean, min–max)	Length of hospitalization – days (mean, min–max)
Scar tension release surgery	11	9,4 (8 months –30 years)	5/6	96 (30–140)	5 (3–8)
Haemangioma excision	3	8 (1–15 years)	0/3	70 (60–80)	6 (4–8)
Laparotomy, hernioplasty	10	13 (1–59)	5/5	56 (30–180)	4 (2–12)
Urological	5	29 (7 months–44 years)	3/2	114 (20–190)	7 (2–10)
Reconstruction of digital congenital malformations	4	6 (4 months –11 years)	1/3	97 (30–180)	4,5 (3–7)
Other interventions	4	5,5 (2–9)	0/4	67 (30–110)	5 (3–8)
Total	37	11,8	14/23	83,3	31

Table 2. OFC surgeries perfomed during the humanitarian mission

Type of surgery	Number of cases	Age–years mean (min-max)	Sex (F/M)	Weight-kg (mean)	Duration of surgery – minutes (mean, min–max)	Length of hospitalization – days (mean, min–max)
Repair of cleft Lip	8	5 months (1 month –12 months)	3/5	7	59 (55–65)	6 (3–8)
Repair of cleft lip and palate	4	40 months (6 months–7 years)	1/3	10	120 (60–150)	8
Repair of palate	1	5 months	0/1	5	60	4
Repair of macro-stomia	1	6 months	0/1	6	90	7
Repair the Tessier numer 3 cleft	1	20 months	0/1	18	110	8
Total	15	15 months	4/11	9	88	6,6

DISCUSSION

Birth registration in the Geita region of Tanzania is extremely low, with fewer than 10% of births registered [12]. The lack of birth registration results in lack of legal identity and severely restricted access to healthcare [13]. Only 30% of births in Africa occur in a hospital setting [4]. Nationwide, 7% of Tanzanian citizens have health insurance, while in the Geita region the population with health insurance reaches only 3.6%. According to a 2022 population study, 10.4% of Tanzanian children are orphans and 11.2% are diagnosed with some form of disability [14]. In the Geita region, only 18.3% of households have access to piped water [14]. Malnutrition and hunger are an everyday reality in this impoverished area. Children with OFCs face considerable feeding difficulties, exacerbated by the lack of access to formula milk. Children with cleft lip usually do not face problems with food intake; however, cleft palate disrupts the ability to generate adequate suction, which impedes breastfeeding [15]. In Geita, children who cannot be breastfed are commonly fed with a mixture of cornmeal and cow's milk. Throughout the qualification, treatment, and follow-up periods, poverty and numerous logistical obstacles became evident. Children with congenital disorders are usually not operated on at San Pio Hospital in Maganzo, but transferred to Mwanza, which is a five-hour journey away.

Maternal factors and complications during pregnancy, such as malnutrition, low folic acid intake [16], and alcohol use are the main contributors to OFCs reported in epidemiological studies. Environmental pollution and contaminants from mining districts may also increase the risk of OFCs [17].

A significant limitation of the treatment was lack of orthodontic consultation during the surgical qualification process. In some cases, remote consultations with orthodontists were carried out using photographs and case descriptions, but X-rays were not available. Interdisciplinary management of OFCs requires orthodontic treatment from the outset and is important at every stage of the treatment [18]. According to current European recommendations, children with cleft lip and palate should be qualified for simultaneous reconstruction once they attain the age of 6 months and a weight of more than 6 kilograms [18], and palatoplasty should be performed before 18 months of age [19]. Most centres perform palate reconstructions between the age of 6 – 14 months, as delayed palatoplasty may be associated with poorer speech development [20]. Belachew et al. analysed 86,683 patients from Eastern Africa with orofacial clefts, and reported that most of the children were malnourished due to socio-economical conditions [20]. A further challenge is the lack of systematic data that would support targetted assistance and education regarding feeding practices for children with OFC [21].

In the current study, the mean age of unoperated children was 5 months, which contrasts with the findings of Belachew et al., who reported a mean age of 9.1 years at the time of the first medical diagnosis of oral cleft [20]. Conway et al. similarly reported an average age of 10.66 years at the time of surgery in East Africa [16]. The average length of hospitalization in their study was 4.5 days, which is shorter than in our experience [16]. Data from African observations are comparable with those from Europe, where the mean hospital stay after cleft palate repair is 4.5 days (± 2.7 days), with the mean hospital stay for cleft lip being slightly longer – 4.1 days (± 2.6 days) [15]. In the current study, simultaneous reconstruction of the lip and palate was performed in children with a mean age of 3.5 years and a mean weight of 16.8 kilograms. The main reason for this delay was limited access to specialists and hospital facilities. In Europe, lip reconstruction is usually performed at the age of 3 months, whereas the mean age at surgery the current study was 2.5 years. In contrast to this, Ephraim et al., who analysed 98 surgical OFC cases in Tanzania over a 6-month period in 2019, reported a mean age of 3 months for lip reconstruction and 11 months for palate. Similarly to the current cohort, the majority of the patients were male [22]. Mwakayoka et al. conducted a retrospective analysis of Smile Train missions in Southern Tanzania and described 63 OFC patients with a mean age of 6 months, again predominantly male, with lip reconstruction being the most common procedure [23]. Butali et al., in an analysis of African data, reported that bilateral lip and palate clefts were less frequent overall; however, in females the proportion of bilateral cleft lip was greater than right-sided cleft lip [8].

Ephraim et al. used the Millard rotation-advancement flap repair in 52.5% of lip repair cases, and the Tennison-Randall technique in 28.7% of cases. In the current study, all cases were operated on using the Tennison-Randall technique. Ephraim et al. performed a combined von Langenbeck technique with palatoplasty in 52.8% of the cases, and the Bardach technique in 5.5%. All procedures were carried out under general anaesthesia. The overall complication rate reported by Ephraim et al. was 14.3%, with the most common complications being bleeding (6 cases) and palatal fistula (4 cases) [22]. Conway et al. reported that most complications in their cohort resulted from Langencbeck palatoplasty (6.3%) [16]. The major limitation of my the current study was the small sample size, which may have influenced the overall complication rates.

The humanitarian mission carried out in the Geita region of Tanzania revealed the tremendous healthcare needs of the local population, particularly in the treatment of congenital craniofacial anomalies. At the same time, it demonstrated that effective surgical intervention is achievable, even under conditions of severely limited infrastructure and medical resources. Despite the absence of anaesthesiologists, paediatric equipment, laboratory facilities, and an intensive care unit (ICU), nearly 50 surgical procedures were successfully performed.

A significant social issue that emerged during the mission was the stigmatization of children with visible deformities. In many cases, families hide such children even from close relatives due to deep-rooted local beliefs. Within parts of the community, a child born with a congenital defect is perceived as a 'curse' cast upon the family for its 'misdeeds'. These cultural perceptions lead to social isolation and substantial delays in seeking medical assistance.

There are challenges in early diagnosis of defects – pervasive poverty and lack of access to specialists. Despite these constraints, both functional and aesthetic outcomes were highly satisfactory. Notably, no post-operative complications were recorded, and all children were discharged home in good general condition. The key factor contributing to the success of the mission was close collaboration with local medical personnel and strong community engagement, which not only enabled the procedures to be performed, but also facilitated staff training and raised awareness of the underlying public health issue.

Following the mission, additional families began presenting at hospital with children affected by craniofacial anomalies. This was not only the result of increased awareness within the region, but also a direct consequence of visible outcomes – children returning to their villages after successful surgeries and hospitalizations served as tangible proof of the effectiveness of the intervention.

This experience clearly demonstrates that even a single, well-prepared surgical mission can substantially improve access to specialized care in low-resource settings. Reconstructive surgery not only restores physical function and health but also dignity, allowing children to reintegrate into family life, pursue education, and develop normally among their peers.

Implementing systematic training programs for local medical teams could enhance the sustainability and safety of future surgical missions.

The prevalence statistics of OFCs found in the literature are significantly underestimated. Most reconstructive surgeries are performed in hospitals in major cities during humanitarian missions organized by international NGO's dedicated to treating OFCs and training local medical staff.

Future initiatives should focus on establishing permanent reconstructive surgery centres in Tanzania and integrating preventive, prenatal, and early diagnostic programs. Strengthening the birth registration system and monitoring child health would represent a fundamental step toward transforming the landscape of healthcare in Tanzania.

CONCLUSIONS

In Geita region of Tanzania, unilateral clefts (70%) were more common than bilateral clefts (30%). The procedure that was most needed was unilateral lip reconstruction.

The major barriers to the development of paediatric surgery in Tanzania include the lack of birth registration, malnutrition, shortage of medical specialists, limited infrastructure, and the complete absence of intensive care units.

There are no centres in Tanzania that provide comprehensive treatment for cleft defects.

Abbreviation

OFC – orofacial clefts

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