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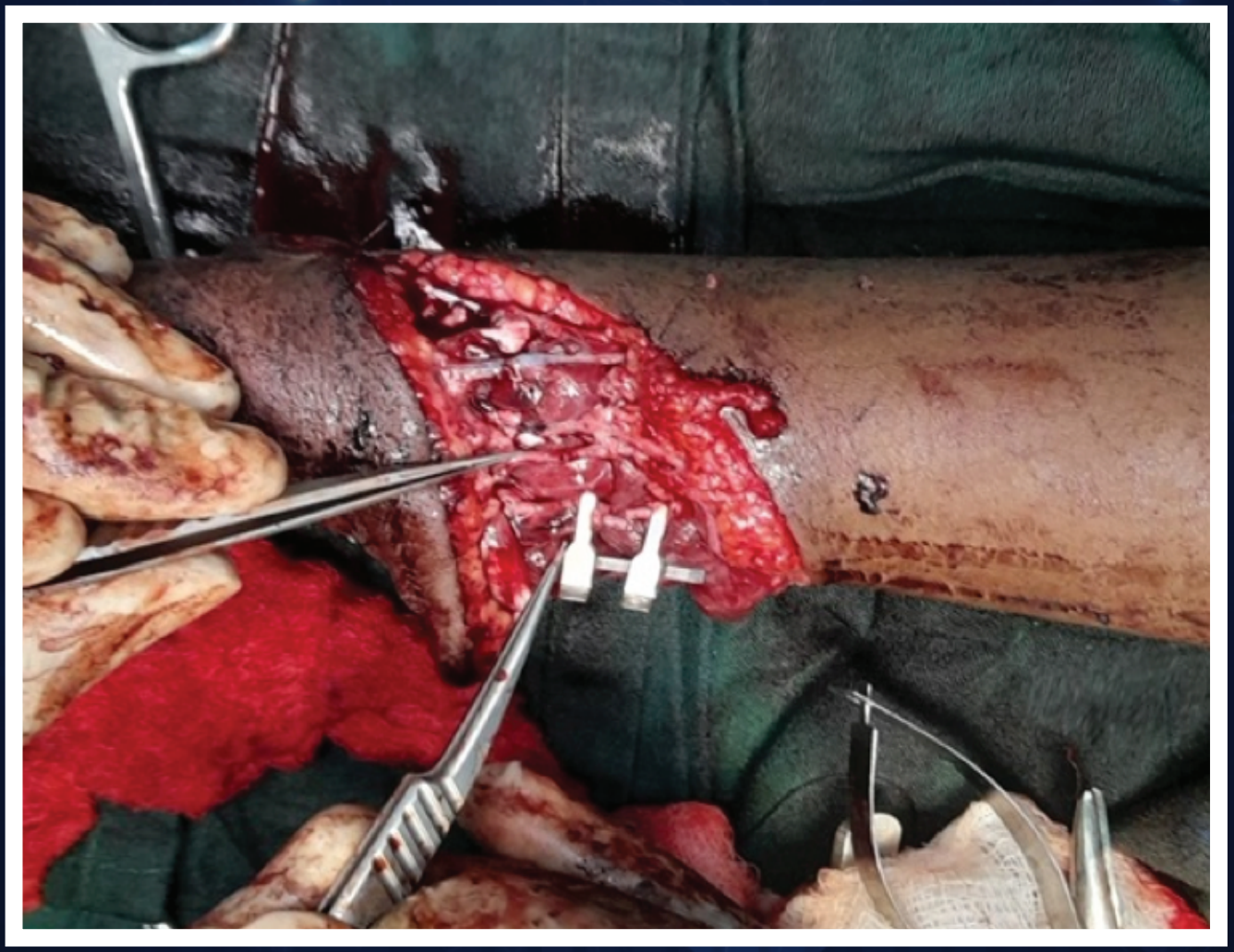

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Editor -in-Chief,

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Kenya Society of Plastic and Reconstructive Surgery

P. O. Box, 19571-00202 Nairobi

Telephone number: 254 724 888 666

Email address: info@panafricanjournal.co.ke

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Contact person and his title- Prof Nangole Editor-in-chief

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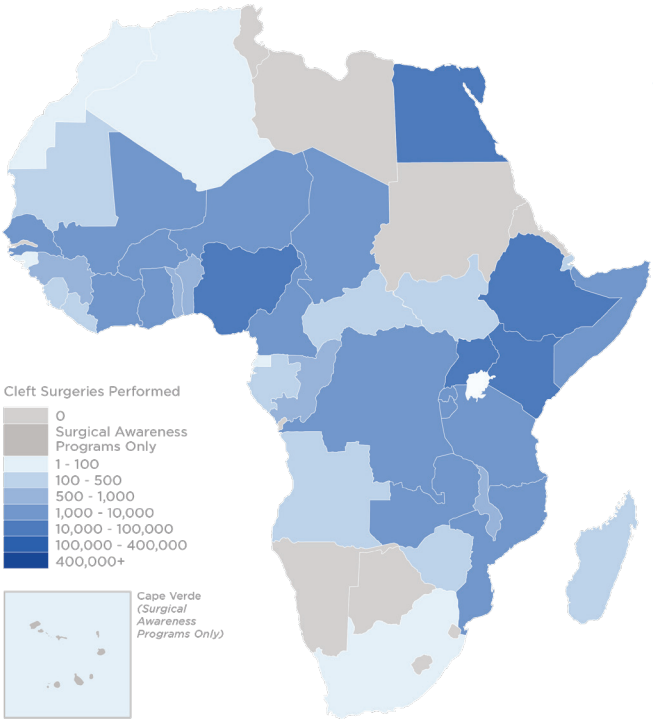

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MARTORELL'S ULCERS MANAGED BY WOUNDECTOMY, FAT LIPOASPIRATE AND SKIN GRAFT: A NEW APPROACH TO TREATMENT
Nangole FW, MBChB,MMEd, PhD, **Khainga S O** ,MBChB, MMEd, **Adegu W**, MBChB, MMed and **Kiriga F.M**, MBChB, MMed, Departement of Surgery, University of Nairobi, P.O. Box 30197-00100, Nairobi, Kenya.

Corresponding Author: Prof. F.W. Nangole, Department of Surgery, University of Nairobi, P.O. Box 30197-00100, Nairobi, Kenya

MARTORELL'S ULCERS MANAGED BY WOUNDECTOMY, FAT LIPOASPIRATE AND SKIN GRAFT: A NEW APPROACH TO TREATMENT

F. W. NANGOLE, S. O. KHAINGA, W. ADEGU and F. M. KIRIGA

ABSTRACT

Background: **Martorell's ulcers are common in hypertensive patients. They are characterized by painful ulceration on the distal aspect of the leg. Management of these wounds have been by surgical debridement with eventual wound closure. We share our experience in patients treated by woundectomy followed by fat lipoaspirate and skin graft.**

Objective: **To audit management of Martorell's ulcer with woundectomy followed by fat injection and skin grafts.**

Methodology: **Patients with histologically confirmed Martorell's ulcer were followed up between January 2017 and December 2022. Woundectomy was done followed by infiltration with fat lipoaspirate. Wounds were then dressed with conventional dressings materials for at least two weeks after which skin graft was done. Post operatively, patients were seen at a regular interval of one year to determine recurrence.**

Results: **A total of 28 patients were seen with histologically confirmed Martorell's ulcers, of whom 18 were female. Two patients had ulcers on both legs. There was considerable reduction in pain score from an average of 8 /10 to 2 /10 after fat grafting of the wounds. All patients had good skin grafts take. Recurrence of the ulcer was noted in one patient during the one year of follow up.**

Conclusion: **Woundectomy followed by lipoaspirate infiltration and skin graft is a reliable method of treating Martorell's ulcers and should be considered as one of the armamentarium in the management of Martorell's ulcers.**

INTRODUCTION

Martorell's ulcers were first reported by a cardiologist Otze Fernando (1). They were described as ulcers on the distal aspect of the leg either in the anterior, lateral and or posterior aspects of the leg. These ulcers are characteristically painful, could be unilateral or bilateral in a symmetrical pattern (1,2). Diagnosis of the ulcer is based on clinical presentation and confirmed by biopsy that demonstrates enda arteritis obliterans of the small blood vessels (2-4). Treatment of Martorell's ulcers has traditionally been by control of hypertension followed by surgical debridement wound dressings and eventual wound closure either by secondary intention or skin graft (2-5). Other adjunct therapies have been by the use of hyperbaric oxygen and lumbar sympatheticotomy (5,6). This treatment path has however been long, tedious and painful (3-5). Adipose lipoaspirate has been described in the management of many chronic wounds such as diabetic ulcers and ischemic wounds with good outcomes (7). The use of adipose lipoaspirate has not been reported for Martorell's ulcers to the best of our knowledge .We share our experience in the management of these ulcers with woundectomy followed by fat lipoaspirates.

MATERIALS AND METHODS

Study Design: This was a prospective audit of patient who presented with histologically confirmed Martorell's ulcer between January 2017 and December 2022. The objective of the study was to determine clinical outcome of patients managed by woundectomy, lipoaspirate and partial thickness skin graft. Specific Objectives were to assess pain reduction and skin graft take rates. For all patients woundectomy was done with at least 5 mm margin plus excision of the ulcer base. After attaining hemostasis fat lipoaspirate was harvested using a 2 mm cannula in a 20 cc syringe.

Figure 1: *Patient with Martorells Ulcer involving posterior lateral aspect of the left leg*

From the lower abdomen, the fat was let to decant for at least 10 minutes. The lipoaspirate was then injected into the wound using a 1 mm cannula at a ratio of 1 ml per 1cm^2 of the wound (Figure 2).

Figure 2: *Lipoaspirate being infiltrated into the wound of the right leg on the lateral aspect*

The injection was done both in the base and the edges of the ulcer. The ulcer was then dressed with petroleum gauze, gauze and crepe bandages. After discharge dressing changes were done every after three days. Wound pain scores were taken at the time of admission before commencing on analgesics and repeated at one week after surgery. Once the wound had granulated well patients were readmitted and skin grafting done. Skin graft take was assessed at one week after surgery during dressing changes (Figure3).

Figure 3: *Martorells' ulcer of the right leg with skin graft after 10 days of follow up. Note good graft take with no evidence of recurrence*

Figure 4: *Martorells ulcer of the right leg fully healed at one year of follow up. Note similarity with the surrounding skin.*

Post skin graft patients were put on compression stockings for at least two months. They were then followed up for one year to determine recurrence.

RESULTS

A total of 28 patients with histologically confirmed Martorell's ulcers were followed up during the study period. All patients had hypertension with two patients suffering bilateral disease at the point of admission. Twenty six patients were reviewed for at least one year. The male female ratio was 1 to 1.5. The average size of the ulcers were 32 .6 cm2 with a range from 16cm2 to 67 cm2. The mean duration of the ulcers were 5.6 months .All wounds were of gradual onset with no history of trauma nor predisposing factors. The mean age for the patients was 59.3 year with an age range of 47 to 75 years .Forty six percent of the ulcers were on the anterior medial aspect of the leg.

Table 1: *The anatomical location of the ulcers*

Anatomical location (Distal Leg)	Frequency	Percentage
Anterior medial	12	46
Posterior medial	4	15.4
Postero lateral	4	15.4
Lateral	3	11-5
Posterior	3	11-5

The average duration after woundectomy/lipoaspirate to skin grafting was 16 .9 days with a range of 12 to 26 days. Pain reduction was noted in all patients after the first procedure with an average reduction on visual analogue scale from 8 to 2 after seven days. Skin graft was approximately 95 percent at one week of follow up. Recurrence of the ulcer was noted in one patient at four

months of follow up. Complications noted were wound sepsis and graft failure in a patient.

DISCUSSION

Martorell's ulcers also referred to as hypertensive leg ulcers which are probably more missed than diagnosed. As a result of this the prevalence and incidence of this ulcers are not known especially in Africa. The ulcers can closely resemble pyoderma gangrenosum and calciphyloxis ulcers that are common in patients with connective disease and renal transplant patients respectively (2,8). However a high index of suspicion compounded by a good history, physical examination and histology is confirmatory for this disease. The management for the ulcers has largely been by surgical debridement followed by wound dressings and eventually wound closure by either secondary intention or skin grafts (2,4,5, 9). The duration over which this happens has largely varied from patient to patient with some taking as long as six months to heal necessitating for better and faster ways of treatment (9). Other adjuncts of treatment has been hyperbaric oxygen, spinal cord stimulation and prostaglandin E1 injection (10-12). Prostaglandin E1 injection in a small series of four patients showed a reduction in the overall treatment duration by about half . It seems to work by causing vasodilatation of the blood vessels leading to increased tissue perfusion. The treatment however requires daily injection of PGE1 which is costly.

Adipose lipoaspirate has been documented in a number of studies as a viable option in the management of chronic wounds such as diabetic wounds, venous ulcers and sickle cell ulcers (7,13). Its use in Martorell's ulcer has however not been described to the best of our knowledge. The lipoaspirate in majority of this studies have shown acceleration of wound healing and reduction in pain (7). Lipoaspirate contains adipose derived stem cells that can differentiate into fibroblasts and keratinocytes in the wounds that would accelerate proliferative phase of wound healing. Other benefits include growth factors such as platelet derived growth factors, vascular endothelial growth factors and fibroblast growth factors that do promote angiogenesis and granulation formation.

In our study all patients managed for Martorell's ulcer had woundectomy followed by fat lipoaspirate injection of the wounds and later on skin grafting once the wound had attained good granulation. The mean duration of treatment between surgical debridement and skin grafting was 16.9 days with a range of 14 to 31 days which was much faster compared to the conventional method of Martorell's ulcer treatment. There was only one ulcer recurrence at one year of follow up. Further the grafted wound had better aesthetic outcome with close resemblance to the neighboring skin (Figure 4). Other benefits included reduction in wound pain. Though skin grafts as a modality of management of Martorell's ulcers has been reported in literature by Dagregorio *et al*, the long term outcome has not been reported (5). Further their study reported skin graft success rate of about 70 percent suggesting that infiltration with lipoaspirate improves on the quality of granulation tissue ensuring on higher graft take rate as reported in our study.

In conclusion woundectomy with fat lipoaspirate provides an alternative approach in the management of Martorell's ulcer. With the lipoaspirate the wounds are able to granulate faster leading to early skin grafting and stable wound coverage compared to the conventional way of management.

REFERENCE

1. Martorell F. Hypertensive ulcer of the leg. *Angiology*. 1950;1: 133–140. [PubMed] [Google Scholar]
2. Mansour M, Alavi A. Martorell ulcer: chronic wound management and rehabilitation. *Chronic Wound Care Management and Research*. 2019; **6:**83-88 https://doi.org/10.2147/CWCMR.S17242
3. Lima Pinto AP, Silva NA Jr, Osorio CT, *et al*. Martorell's Ulcer: Diagnostic and Therapeutic Challenge. *Case Rep Dermatol*. 2015 Aug 5;**7(2):**199-206. doi: 10.1159/000430884. PMID: 26351431; PMCID: PMC4560305.
4. Davison S, Lee E, Newton ED. Martorell's ulcer revisited. *Wounds*. 2003;15:208–212. [Google Scholar]
5. Dagregorio G, Guillet G. A retrospective review of 20 hypertensive leg ulcers treated with mesh skin grafts. *J Eur Acad Dermatol Venereol*. 2006 Feb;**20(2):**166-9. doi: 10.1111/j.1468-3083.2006.01399.x. PMID: 16441624.
6. Palou J. Lumbar sympathectomy in the treatment of hypertensive ischemic ulcers of the leg (Martorell's syndrome) *Circulation*. 1955;12:239–241. [PubMed] [Google Scholar
7. Gill AL, Bell CN. Hyperbaric oxygen: its uses, mechanisms of action and outcomes. *QJM*. 2004;**97:**385–395. [PubMed] [Google Scholar]
8. Malik D, Luck J, Smith OJ, Mosahebi A. A Systematic Review of Autologous Fat Grafting in the Treatment of Acute and Chronic Cutaneous Wounds. *Plast Reconstr Surg Glob Open*. 2020 May 18;**8(5):**e2835. doi: 10.1097/GOX.0000000000002835. PMID: 33154876; PMCID: PMC7605858.
9. Graves JW, Morris JC, Sheps SG. Martorell's hypertensive leg ulcer: case report and concise review of the literature. *J Hum Hypertens*. 2001;**14:**279–283. [PubMed] [Google Scholar

10. Pacifico F, Acernese CA, Di Giacomo A. PGE(1) therapy for Martorell's ulcer. *Int Wound J.* 2011 Apr;**8(2):**140-4. doi: 10.1111/j.1742-481X.2010.00760.x. Epub 2011 Feb 11. PMID: 21310004; PMCID: PMC7950480
11. Villanueva JA, Vicente L, Mazzinari G, Fabregat GA, Monsalve JM. Use of a spinal cord stimulator for treatment of Martorell hypertensive ulcer. *Reg Anesth Pain Med.* 2001;**36:**83–86. [PubMed] [Google Scholar]
12. Atiyeh BS, Ioannovich J, Al-Amm CA, El-Musa KA. Management of acute and chronic open wounds: the importance of moist environment in optimal wound healing. *Curr Pharm Biotechnol.* 2002;**3:**179–195. [PubMed] [Google Scholar]

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BURN INJURIES BEFORE AND DURING COVID-19 PANDEMIC PERIOD AS SEEN AT A TERTIARY REFERRAL HOSPITAL IN EASTERN AFRICA
Adegu W, P. O. Box 1663-50100, Kakamega, Kenya, **B. Wabwire,** Kenyatta National Hospital, **M. Meme,** Kenyatta National Hospital, **A. Muoki,** University of Nairobi, department of plastic, reconstructive and aesthetic surgery, P. Kituyi, Moi University, department of surgery and anaesthesiology, **S. Khainga,** University of Nairobi, department of plastic, reconstructive and aesthetic surgery and **F. Nang'ole**, University of Nairobi, department of plastic, reconstructive and aesthetic surgery

Corresponding author: Dr. Adegu William, Tel +254-796-688-828. Email address: jacobadegu@yahoo.com.

BURN INJURIES BEFORE AND DURING COVID-19 PANDEMIC PERIOD AS SEEN AT A TERTIARY REFERRAL HOSPITAL IN EASTERN AFRICA

ADEGU W, B. WABWIRE, M. MEME, P. KITUYI, S. KHAINGA and F. NANG'OLE

ABSTRACT

Background: **COVID-19 pandemic has worldwide social-economic effect. However, there's paucity of knowledge in the nature and severity of burn injuries before and during Covid-19 pandemic era.**

Objectives: **To determine the difference in burn injuries witnessed before and during COVID-19 pandemic period**

Design: **Descriptive retrospective study covering the period between 12th March 2018 to 12th March 2021. This encompassed the pre-Covid-19 era as well as the Covid-19 pandemic era. Data from all burn's unit/wards spanning 3 years was retrieved. Data was cross checked and only complete and accurate data was incorporated. Data analysis was done using chi square test and Fisher's exact test. P-value was set at 0.05.**

Results: **There was generally an increase in the number of patients who sustained thermal and electrical burns during Covid-19 pandemic period. More males sustained burn injuries in the Covid-19 pandemic period, accounting for 56.6% of all burn injuries compared to their female counterparts (43.4%). This was statistically significant (P= <0.005)**

Conclusion: **The present study demonstrated that there was a significant increase in thermal and electric burns during the covid-19 pandemic period. These burns involved all the various age groups especially the preschool going children. The current study postulated probable explanations of this increase in thermal and electric burns during Covid 19 pandemic period to be due to the forced lockdowns, children left unattended to or under insufficient supervision.**

Key words: **Thermal burns, Electrical burns, Covid-19, burns unit**

INTRODUCTION

COVID-19, which is also known as Corona virus disease 2019 broadly refers to a disease or illness that is propagated by a new (novel) type of Corona virus that is also referred to as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (3). It is important to note that this novel Covid-19 virus was first identified in Hubei province of China. This Covid-19 disease was then reported to the WHO (World Health Organization) on December 31st 2019. (4,5). A few months later, the WHO declared the Covid-19 outbreak as a global pandemic in March 11, 2020.

Corona viruses are enveloped positive-stranded RNA viruses. Beta Corona virus is the Corona virus known to cause COVID-19. The Middle East respiratory syndrome (MERS) virus is also another Beta Corona virus related to the Covid-19 virus. The host receptor for SARS-CoV-2 cell entry is the same as for the angiotensin-converting enzyme 2 (ACE2) (8). SARS-CoV-2 binds to ACE2 during the receptor-binding domain of its spike protein. The cellular protease TMPRSS2 is also an important factor for SARS-CoV-2 cell entry. Other variants that are associated with Covid-19 include Delta and Omicron.

Due to the nature of spread, infectivity rate as well as severity of the infection, COVID-19 pandemic has

led to adverse socio-economic effects throughout the globe (1). This can be attributed to COVID-19 itself as well as the COVID-19 related restrictions e.g. lockdowns, restriction of movements, curfews, restriction of public gatherings as well as stay at home orders (1,2). These orders being well-intentioned, apart from leading to depression, attempted suicide, homicides, anxiety and stress, they also led to loss of livelihoods and subsequent increase in crime, substance abuse, domestic violence as well as burns (3-5). However, there is paucity of knowledge in the nature of burns cases witnessed locally during the COVID-19 pandemic period. The objective of the current study was to demonstrate the difference in burn injuries between the pre and during COVID-19 pandemic period as seen in a tertiary hospital in Kenya.

MATERIALS & METHODS

The current study was a descriptive retrospective study for a period of 3 years from 12th March 2018 to 12th March 2021. The study was conducted at KNH which is the largest national referral hospital, besides attending to numerous burns patients. It also provides better representation of the disease burden and hence the most probable outcomes can be conclusively reached at due to the diversity of patients seeking treatment at the facility. All records of patients with diagnosis of burns between 12th March 2018 to 12th March 2021were sampled and analyzed. Files with incomplete or missing data were excluded from the study. Ethical approval to carry out the current study was given by the KNH /UON Ethics Research Committee.

RESULTS

A total of 905 patients' records met the inclusion criteria, 407 and 498 records for patients treated for burn injuries during the pre-Covid 19 and during Covid-19 pandemic period respectively. The demographic characteristics of the patients treated for thermal burn injuries is shown in table 1 below. There was generally an increase in the number of patients who sustained thermal and electrical burns during covid-19 pandemic period throughout the age groups. More males sustained burn injuries in the Covid-19 pandemic period, accounting for 56.6% of all burn injuries compared to their female counterparts (43.4%). Most of the individuals who got burnt during the Covid-19 pandemic period were pre-school children (39%), followed by those in primary school (30.3%) and those aged between 4-10 years (11%). There was however a decrease in number of chemical burns in the Covid-19 pandemic period. The least group of patients who sustained burns during Covid 19 pandemic period were those with tertiary level knowledge, accounting for 0.8%. These differences were statistically significant (P Value=0.008.)

Table 1: *Demographic characteristics*

	Pre-Covid *(n=407)*	**During-Covid** *(n=498)*	**p-value**
Age in years			
≤ 10	249 (61.2)	280 (56.2)	0.255
11 – 20	37 (9.1)	64 (12.9)	
21 – 30	59 (14.5)	79 (15.9)	
> 40	62 (15.2)	75 (15.1)	
Gender			
Male	217 (53.3)	282 (56.6)	0.319
Female	190 (46.7)	216 (43.4)	
Education			
Adult 18+ years (unknown)	17 (4.2)	33 (6.6)	**0.008**
Child 11 – 17 years	0 (0.0)	8 (1.6)	
Child 4 – 10 years	28 (6.9)	55 (11)	
Pre-school level	187 (45.9)	198 (39.8)	
Primary	119 (29.2)	151 (30.3)	
Secondary	50 (12.3)	49 (9.8)	
Tertiary	6 (1.5)	4 (0.8)	

Various types of Burn injuries

The various descriptions of the types of burns sustained between the 2 study periods are documented in table 2 below. There was a decrease in chemical burn injuries during the Covid-19 pandemic period. However, there was an increase in both thermal and electrical burns in the Covid-19 pandemic period (98.9%) compared to the pre-Covid 19 pandemic period (91.9%). This increase was significantly significant (P =0.001). More than 50% of all the thermal burns witnessed between the two periods were in form of scalds, which was followed by open flame (> 20%). There was a significant increase in inhalational burn injuries in the Covid 19 pandemic period (4.4%). It is also important to note that besides there being more patients treated for scald burns in the Covid 19 pandemic period compared to pre-Covid 19 pandemic period, there was an overall decrease in the proportion of scald burns by 4.1% in the Covid 19 pandemic period. The chemical burns witnessed were primarily due to assault with domestic cleaning products.

Table 2: *Types of burn injuries*

	Pre-Covid *(n=407)*	**During-Covid** *(n=498)*	**p-value**
Chemical	4 (1.0)	2 (0.4)	**0.001**
Electrical	29 (7.1)	35 (0.7)	
Flame	108 (26.5)	120 (24.1)	
Flame and Inhalational	26 (6.4)	47 (9.4)	
Inhalational Burns	1 (0.2)	22 (4.4)	
Scald	239 (58.7)	272 (54.6)	

Burn injuries according to TBSA

There was marginal increase in TBSA burned in the Covid 19 pandemic period for those burns involving between 11-20% of TBSA, and those burns involving more than 31% of the TBSA. However, this increase was not statistically significant as shown in table 3 below.

Table 3: *TBSA*

	Pre-Covid *(n=407)*	**During-Covid** *(n=498)*	**p-value**
≤ 10%	118 (29.0)	143 (28.7)	0.095
11 – 20%	179 (44.0)	224 (45.0)	
21 – 30%	76 (18.7)	69 (13.9)	
31 – 40%	25 (6.1)	34 (6.8)	
41 – 50%	3 (0.7)	6 (1.2)	
> 50%	1 (0.2)	8 (1.6)	
Unknown	5 (1.2)	14 (2.8)	

Burn injuries according to depth

The table 4 bellow indicates the burn depths witnessed during the two comparative periods. Apart from 2nd degree deep and 2nd degree mixed burns, there was an increase in all the other burn depths in the Covid 19 pandemic period. However, this increase was not statistically as evidenced by the P-value in the table below.

Table 4: *Depth*

	Pre-Covid *(n=407)*	**During-Covid** *(n=498)*	**Suggested Class**
2nd degree deep	17 (4.2)	19 (3.8)	0.121
2nd degree mixed	101 (24.8)	94 (18.9)	
2nd degree superficial	267 (65.6)	341 (68.5)	
3rd degree	10 (2.5)	15 (3)	
4th degree	1 (0.2)	1 (0.2)	
Unknown	11 (2.7)	28 (5.6)	

Management

Most of the thermal burn injuries across the 2 periods (>50%) were managed conservatively as indicated in the table 5 below. However, there was a significant increase (P=0.024) in the number of pure debridement, pure grafting, debridement coupled with amputations, debridement coupled with grafting as well as flap cover in the Covid 19 pandemic period.

Table 5: *Management*

	Pre-Covid *(n=407)*	**During-Covid** *(n=498)*	**p-value**
Conservative	256 (62.9)	297 (59.6)	**0.024**
Debridement	3 (0.7)	6 (1.2)	
Debridement, Amputation	1 (0.2)	6 (1.2)	
Debridement, Grafting	125 (30.7)	143 (28.7)	
Debridement, Grafting, Amputation	9 (2.2)	4 (0.8)	
Debridement, Grafting, Flap	0 (0.0)	1 (0.2)	
Grafting	3 (0.7)	7 (1.4)	
Unknown	10 (2.5)	33 (6.6)	

Complications

The table 6 bellow shows the complications encountered when managing thermal burn patients between the two study periods. The complications were classified into 4 main categories i.e. anemia, acute kidney injury (AKI), contractures and sepsis. This was based on the nature of complications documented in the treatment records. Apart from an increase in the number of patients who contracted sepsis during covid19 pandemic period, there was a decrease in all the other complications. However, these differences were not statistically significant as evidenced in the table 6 bellow.

Table 6: Complications

	Pre-Covid *(n=407)*	During-Covid *(n=498)*	p-value
Anaemia			
Yes	111 (27.3)	115 (23.1)	0.148
No	296 (72.7)	383 (76.9)	
AKI			
Yes	6 (1.5)	5 (1.0)	0.521
No	401 (98.5)	493 (9.09)	
Contractures			
Yes	11 (2.7)	11 (2.2)	0.631
No	396 (97.3)	487 (97.8)	
Sepsis			
Yes	31 (7.6)	43 (8.6)	0.578
No	376 (92.4)	455 (91.4)	

Outcome

There were 3 main outcomes as indicated in the table 7 below. There was a significant reduction in the number of patients who were discharged on follow up in the Covid-19 pandemic period (P=0.002). There was an increase in mortality (P=0.004) in the Covid-19 pandemic period, as shown in the table below.

Table 7: *Outcome*

	Pre-Covid *(n=407)*	**During-Covid** *(n=498)*	**p-value**
D on follow up			
Yes	404 (99.3)	478 (96.0)	**0.002**
No	3 (0.7)	20 (4.0)	
Mortality			
Yes	2 (0.5)	16 (3.2)	**0.004**
No	405 (99.5)	482 (96.8)	
Permanent incapacitation			
Yes	10 (2.5)	8 (1.6)	0.362
No	397 (97.5)	490 (98.4)	

DISCUSSION

The current study was objectively set out to determine the difference in the various types of burn injuries between the pre-Covid-19 and during Covid-19 pandemic period as seen in a tertiary hospital in Kenya. Of the targeted 2,000 files, only 45% that met the inclusion criteria could be analyzed. This is because most of the files had missing data while some were untraceable. Various parameters were assessed including demographic characteristics, nature and depth of burn injuries, TBSA involved, management, complications and outcome.

There was a pattern of increase in number of patients treated for thermal and electrical burn injuries across all the age groups in the Covid19 pandemic period. Majority of the patients in both study periods were preschool going children (19). The authors hypothesized that the significant increase in thermal and electrical burns in pre-school going children during Covid 19 pandemic period (P= 0.008) could have been due to closure of schools during the pandemic period, and hence most of the children who should have been in schools were still at home. Another school of thought by the authors accounting for the higher incidence of thermal burn injuries in the preschool going age group was due to lack of

adequate supervision by their parents, guardians, elder siblings and or neighbors, lack of protector cages as well as lack of health education (20). Most of the thermal and electrical burns involving children occurred within indoors while those involving adults occurred in outdoor settings including places of work, social places and the streets (20). There was however a statistically significant difference in reduction of the number of individuals managed for thermal and electrical burns with tertiary level education in the Covid 19 pandemic period. This could be attributed to the effect of knowledge, exposure and responsibility that is imparted on students in higher institutions of learning.

Scald burns were the most common type of thermal burns witnessed during the two study periods (20 & 21). The number of patients managed for scald burns significantly increased during the Covid-19 pandemic period (p=0.001). This was followed by open flame burns. The least type of thermal burns was inhalational burns, which despite significantly increasing to more than twenty fold in the Covid-19 pandemic period, it only accounted for 4.4% of the total burns. This increase in scald burns during the Covid-19 pandemic period could be attributed due to the low socio-economic status of the family involved, lack of safety measures and lockdown measures. Most of these burns occurred in single room homes, where cooking activities take place next to the children's beddings. The children then accidentally hit kettles of boiling water or foods such as porridge ending up sustaining splash burns. In such environments, due to limitation of space, the inhabitants of these houses especially children sustain accidental burns during playing. The lock down measures on the other hand increased children's time in these houses hence increasing their chances of getting into contact with fire and hence end up sustaining thermal burns. Such was the case with thermal burns that occurred due to a house catching fire, secondary to children playing with matchsticks and exploring the consequences of fire.

Moreover, a few thermal burns occurred outdoors. In such instances, children playing with minimal supervision ended up lighting fires and throwing canisters containing inflammable materials to fire thereby inadvertently sustaining thermal burns.

For the thermal burns involving adults, most of the injuries were accidental and or due to intoxication. A few were secondary to assault. In contrast to another almost similar study where burn injuries involving adults were documented to have occurred in their workplaces, these burns in our set up occurred outside their working areas (21). Accidental burns in adults included gas explosion when lighting a gas cooker, sparks from cigarette near a fuel tanker, forgotten candle lights which eventually burn the beddings and the house at large as well as explosion from a generator. The thermal burns involving intoxicated adults were due to accidentally falling on a source of fire e.g. Jiko or gas and not being able to perceive that they were being burnt. The reasons given for intoxicating themselves with drugs of abuse included being sacked from their jobs, psychological stress as well as the difficult economic times, making it difficult for them to afford a meal. The thermal burns that were due to assault were secondary to being set on fire by mob justice, as a way of punishing the individual for stealing. Some of the reasons given by the culprits for stealing included so as to get food, to be able to pay rent as well as get money to buy drugs of abuse.

Chemical burns captured involved adults and were due to assault by persons known to the subjects. This was done using locally available cleaning materials and almost always involved the face region. The decrease in chemical burns in the Covid-19 pandemic period could however be explained by the financial implications associated with their acquisition, hence making their use unpopular, especially during the Covid-19 pandemic period, when the social-economic status was dwindling worldwide.

As regards the TBSA burns involved, most of the burns in both study periods involved between 11 to 20% of the total body surface area, compared to less than 4% of the total burns sustained involving more than 40% of the TBSA. This could be explained by the fact that burns involving more than 40% of the TBSA are severe burns and probably the patients did not make it in time to the tertiary level hospital. Besides, most individuals successfully rescued from thermal burns in our setting usually sustain between 10 and 20% TBSA.

In terms of burn depth, most of the patients managed for the various types of burn injuries in both study periods suffered 2nd degree superficial burns (> 60%), compared to 3rd and 4th degree burns which contributed to less than 4% of the total burns.

CONCLUSION

The COVID-19 outbreak and subsequent lockdown gave us the opportunity to look into the various causes and conditions that predispose to burn injuries in such unusual and unforeseeable circumstances.

Burns are common, preventable injuries with serious consequences for patients, their families, and healthcare providers. Understanding the link between certain circumstances and a person's susceptibility to burn injuries is critical for guiding prevention strategies and planning burn units.

The present study demonstrated that there was a significant increase in the various types of burn

injuries during the Covid-19 pandemic period. These burns involved all the various age groups especially the preschool going children. The least affected were individuals with tertiary level education. The current study postulated probable explanations of this increase in thermal and electrical burns during the Covid 19 pandemic period to be due to the forced lockdowns, children left unattended to or under insufficient supervision, intoxication, psychological stresses due to loss of livelihoods low socioeconomic status and lack of fire safety mechanisms in the respective households. The decrease in chemical burns in the Covid-19 pandemic period could however be explained by the financial implications associated with their acquisition, hence making their use unpopular, especially during the Covid-19 pandemic period, when the social-economic status was dwindling worldwide.

The current study seeks to recommend that the government to consider fire safety dynamics before approval of rental buildings. Individuals living in informal settlement to also undergo fire safety training. Moreover, the present study also emphasizes on the need of the burn society in Kenya to conduct fire safety drills targeting the people living in the informal settlement. Electric wires should never be left hanging and every construction site should be properly secured to cushion children from sustaining electrical burns. Team building activities should also form part and parcel of employees' activities, especially those involved with direct handling of electrical power lines. More plastic surgeons should also be trained so as to match the need of thermal burns burden in the country. Besides, fire safety as well as first aid lessons should be included in elementary school lessons. Furthermore, further studies to investigate other possible reasons behind increase in thermal burns in the Covid-19 pandemic period are recommended

In a nutshell, these findings from the current study may help us better understand the inherent susceptibility of various situations to burn injuries, as well as aid in the development of burn prevention strategies, such as campaigns or guides that will instruct parents in the event of future lockdowns or similar situations.

REFERENCES

1. Ali, A., Ahmed, M., Affairs, N. H.-J. of P., & 2020, undefined. (2020). Socioeconomic impact of COVID-19□19 pandemic: Evidence from rural mountain community in Pakistan. *Wiley Online Library*. https://doi.org/10.1002/pa.2355
2. Poudel, K., Social, P. S.-I. J. of, & 2020, undefined. (2020). Impact of COVID-19-19 pandemic on socioeconomic and mental health aspects in Nepal. *Journals.Sagepub.Com*, *2020*(8), 748–755. https://doi.org/10.1177/0020764020942247
3. Gopalan, H., Research, A. M.-D. & M. S. C., & 2020, undefined. (n.d.). COVID-19-19 pandemic and challenges for socio-economic issues, healthcare and National Health Programs in India. *Elsevier*. Retrieved October 7, 2021, from https://www.sciencedirect.com/science/article/pii/S1871402120301600
4. Yamamoto, R., Sato, Y., Matsumura, K., & Sasaki, J. (2021). Characteristics of burn injury during COVID-19 pandemic in Tokyo: A descriptive study. *Burns Open*, *5*(4), 40–45. https://doi.org/10.1016/J.BURNSO.2021.06.007
5. D'Asta, F., Choong, J., Thomas, C., Adamson, J., Wilson, Y., Wilson, D., Moiemen, N., & Farroha, A. (2020). Paediatric burns epidemiology during COVID-19 pandemic and 'stay home' era. *Burns*, *46*(6), 1471. https://doi.org/10.1016/J.BURNS.2020.06.028
6. Bodrud-Doza, M., Shammi, M., Bahlman, L., Islam, A. R. M. T., & Rahman, M. M. (2020). Psychosocial and Socio-Economic Crisis in Bangladesh Due to COVID-19-19 Pandemic: A Perception-Based Assessment. *Frontiers in Public Health*, *8*. https://doi.org/10.3389/FPUBH.2020.00341/FULL
7. Maria, N., Zaid, A., Catrin, S., Surgery, K. A.-… J. of, & 2020, undefined. (n.d.). The socio-economic implications of the coronavirus pandemic (COVID-19-19): A review. *Pdfs.Semanticscholar.Org*. https://doi.org/10.34293/commerce.v8i4.3293
8. Zhou P, Yang XL, Wang XG, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature 2020; 579:270.
9. Parvathi Varma, MBChB, BSc (Hons), MRCS(Eng), Diana Kazzazi, MBChB, MRCS, Mohammad Umair Anwar, MBBS, FCPS(Surg),
10. Stojkoski, V., Utkovski, Z., … P. J.-A. at S., & 2020, undefined. (2020). The socio-economic determinants of the coronavirus disease (COVID-19-19) pandemic. *Papers.Ssrn.Com*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3598631
11. Alradhawi, M., Shubber, N., … J. S.-I. journal of, & 2020, undefined. (n.d.). -19 pandemic on mental well-being amongst individuals in society-A letter to the editor on "The socio-economic implications of the coronavirus and COVID-19-19 …. *Ncbi.Nlm.Nih.Gov*. Retrieved October 7, 2021, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7198428/
12. Nicola, M., Alsafi, Z., Sohrabi, C., … A. K.-I. journal of, & 2020, undefined. (n.d.). The socio-economic implications of the coronavirus pandemic (COVID-19-19): A review. *Elsevier*. Retrieved October 7, 2021, from https://www.sciencedirect.com/science/article/pii/S1743919120303162
13. Mishra, N., Das, S., Yadav, S., Khan, W., … M. A.-S., & 2020, undefined. (n.d.). Global impacts of pre-and During-COVID-19-19 pandemic: Focus on socio-economic consequences. *Elsevier*. Retrieved October 7, 2021, from https://www.sciencedirect.com/science/article/pii/S2666351120300425
14. Gopalan, H. S., & Misra, A. (2020). COVID-19-19 pandemic and challenges for socio-economic issues, healthcare and National Health Programs in India. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, *14*(5), 757–759. https://doi.org/10.1016/J.DSX.2020.05.041

15. Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19-19): A review. *International Journal of Surgery*, *78*, 185–193. https://doi.org/10.1016/J.IJSU.2020.04.018
16. Cheng, S. O. (2020). Xenophobia due to the coronavirus outbreak – A letter to the editor in response to "the socio-economic implications of the coronavirus pandemic (COVID-19-19): A review." *International Journal of Surgery*, *79*, 13–14.
17. Sardar, S., Abdul-Khaliq, I., Ingar, A., Amaidia, H., & Mansour, N. (2020). 'COVID-19-19 lockdown: A protective measure or exacerbator of health inequalities? A comparison between the United Kingdom and India.' a commentary on "the socio-economic implications of the coronavirus and COVID-19-19 pandemic: A review." *International Journal of Surgery*, *83*, 189–191.
18. Niu, J., Rodriguez, J. A., Sareli, C., Goldman, J., Puga, M., & Eckardt, P. A. (2021). COVID-19-19 infection among first responders in Broward County, Florida, March–April 2020. *Journal of Public Health*, *43*(3), 450–454. https://doi.org/10.1093/PUBMED/FDAA231
19. Xiang-jun Chen, Wei-jing Sun, Jing Wang, De-zhi Han, Guo-zhen Gao, De-xiong Yan, Xiao-chun Zhao, Xing-wei Yao, Li Wang, Gong-sheng Wang, Epidemiology of bedside stove burns in a retrospective cohort of 5089 pediatric patients, Burns, Volume 40, Issue 8, 2014,Pages 1761-1769, ISSN 0305-4179, https://doi.org/10.1016/j.burns.2014.03.018.
20. Dani Kruchevsky, MD, Shir Levanon, BA, Adi Givon, BSc, Moran Bodas, PhD, Israeli Trauma Group, Yitzchak Ramon, MD, Yehuda Ullmann, MD, Assaf A Zeltzer, MD, PhD, Burns During Coronavirus Disease 19 Lockdown: a Multi-Center Retrospective Study in Israel, *Journal of Burn Care & Research*, 2022;, irac078, https://doi.org/10.1093/jbcr/irac078
21. Dani Kruchevsky, MD, Maher Arraf, MD, Shir Levanon, BA, Tal Capucha, PhD, Yitzchak Ramon, MD, Yehuda Ullmann, MD, Trends in Burn Injuries in Northern Israel During the COVID-19 Lockdown, *Journal of Burn Care & Research*, Volume 42, Issue 2, March/April 2021, Pages 135–140, https://doi.org/10.1093/jbcr/iraa154
22. Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19-19): A review. *International Journal of Surgery*, *78*, 185–193. https://doi.org/10.1016/J.IJSU.2020.04.018
23. Zaami, S., Marinelli, E., & Varì, M. R. (2020). New Trends of Substance Abuse During COVID-19-19 Pandemic: An International Perspective. *Frontiers in Psychiatry*, *0*, 700. https://doi.org/10.3389/FPSYT.2020.00700
24. Chiang, C. H., Chiang, C. H., & Chiang, C. H. (2020). Letter to editor - Can universal masking help with our recovery from the COVID-19-19 pandemic? *International Journal of Surgery*, *79*, 125–126.
25. Saffle, J. R., Davis, B., Williams, P., & Group, T. A. B. A. R. P. (1995). Recent Outcomes in the Treatment of Burn Injury in the United States: A Report From the American Burn Association Patient Registry. *The Journal of Burn Care & Rehabilitation*, *16*(suppl_3_pt_1), 219–232. https://doi.org/10.1097/00004630-199505000-00002
26. *Friction Blisters: Background, Pathophysiology, Etiology*. (n.d.). Retrieved November 4, 2021, from https://emedicine.medscape.com/article/1087613-overview#a5

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VASCULARIZED LYMPHNODE TRANSPLANT SURGERY WITH NODES FROM TWO DIFFERENT ANATOMICAL SITES IN THE NECK: A COMPARATIVE STUDY
Nangole FW, MBChB, MMed, PhD, Prof., Head thematic unit, **Khainga SO,** MBChB, MMed, Prof, **Adegu W,** MBChB, MMed, **Kiriga M.F,** MBChB, MMed**, Nyabuto C,** MBChB, **Aswan J,** MBChB, **Omutsani MM,** MBChB and **Njuguna NN,** MBChB**,** Department of Plastic and Reconstructive and Aesthetic Surgery, University of Nairobi, Kenya

Corresponding Author: Prof. F.W. Nangole, Head Thematic Unit, Department of Plastic and Reconstructive and Aesthetic Surgery, University of Nairobi, Kenya

VASCULARIZED LYMPHNODE TRANSPLANT SURGERY WITH NODES FROM TWO DIFFERENT ANATOMICAL SITES IN THE NECK: A COMPARATIVE STUDY

F. W. NANGOLE, S. O. KHAINGA, W. ADEGU, M. F. KIRIGA, C. NYABUTO, J. ASWANI, M. M. OMUTSANI and N. N. NGUGI

ABSTRACT

Background: **Lymphedema is characterized by accumulation of lymphatic fluid in a given body part. Lympho vascular transplant surgery has now become one of the main modalities in the treatment. There is however no consensus on the ultimate donor sites. We share our experience with vascularized lymph node transplant surgery with nodes gotten from two different anatomical locations in the neck.**

Objective: **To determine the outcome of patients managed by vascularized lymph node transplant surgery with lymphovascular tissues from sub-mandibular and supraclavicular donor sites.**

Methodology: **This was a comparative study of patients managed by lymphovascular tissue transplant in Kenyatta National Hospital, a tertiary hospital in Kenya between January 2013 and December 2023. All patients had lymphoscintigraphy done to confirm the diagnosis of lymphoedema .Patients were divided based on lymph node donor sites ; one group (SMN) and the supraclavicular group (SCN) The limb girths were taken prior to surgery and then followed up at regular interval for at least one year. Variables considered in the study were the length of surgery, number of nodes harvested, reduction in the limb girth and complications.**

Results: **A total of 44 patients were seen with 24 patients in SMN and 20 in SCN. The age range for the patients were 13 to 67 years with a mean age of 36 .6 years. The mean time for harvesting the nodes in the SCN was 3 hours 19 minutes while the SMN was 2 hours 14 minutes. There were more nodes harvested from the SMN compared to the SCN group though the difference was not statistically significant.**

Conclusion: **Both donor sites are effective in the management of lymphedema. However there is significant reduction in the operative time with the submandibular group of nodes due to a more consistent anatomical location of the blood vessels.**

INTRODUCTION

Vascularized lymph node transplant surgery (VLNT) though first described in rodents in 1979 followed by clinical application in 1982 , has gained momentum in the last few years with more centers adopting this technique alongside lymphaticovenous anastomosis (1) The technic involves harvesting lymph nodes with the surrounding adipofascial tissues and blood vessels and anastomosing them to the recipient site in an area where there is marked lymphedema. The optimal donor sites for the nodes should be one that provides more nodes , easy to harvest and has minimal morbidity to the patients. Traditional donor sites include the groin, axilla, omentum and the neck region. The groin and axilla though commonly used in some centers have been shown to have undesired complications such as secondary lymphedema that could be catastrophic to the patient (6,7).Though the omentum as a donor has been perfected in some

centers it is a more invasive procedure leading to either open or laparoscopic laparotomy. The neck nodes have been reported in literature by many authors. Commonly used nodes have been the submandibular nodes (SMN) harvested with the facial artery and the supraclavicular node (SCN) harvested with the transverse cervical artery. No studies to our knowledge have been done to compare nodes from these two distinct anatomical locations in the neck. We undertook this study to compare patients managed by either modality of treatment.

MATERIALS AND METHODS

Study Design: This was a comparative study of patients managed at Kenyatta National Hospital a tertiary hospital in Kenya of lymphoscintigraphy confirmed lymphedema between January 2013 and December 2023.

Study Subject: Patients were consecutively sampled into two groups with one group managed by SCN and the other with SMN. Consent / assent to participate in the study were taken from all patients. Ethical approval was gotten from the local ethics board.

Figure 1: *Harvested lymphnodes form the submandibular region*

Prior to surgery a thorough clinical examination was done to determine the extent of lymphoedema. The affected limb girth was measured using a tape from a fixed position; for the lower limb 12 cm proximal to the tip of the medial malleolus and for the upper limb 12 cm proximal to the radial styloid process. Variables determined were the average length of time taken to harvest the nodes, the number of nodes harvested, complications encountered at the donor site and the reduction in lymphedema at one year of follow up. The recipient site for both groups was determined by the extent of lymphedema with lymphedema involving the entire lower limbs nodes placed in the proximal thigh, involvement up to the distal thigh in the popliteal region, involvement of the leg placement around the ankle region. For the upper limb the nodes were placed in the forearm. (Figures 2-4).

Figure 2a: *Patient with left arm grade 3 lymphoedema*

Figure 2b: *Patient 2A, with resolved lymphoedema after transplant surgery, Note donor site in the distal arm*

Figure 3A: *Patient with both left and right leg grade 3 lymphoedema*

Figure 3B: Same patient in figure 3A, with resolved left leg lymphoedema after transplant in the distal leg

Figure 4:

Post operatively follow up was at a regular interval for at least one year to determine on the outcome of the procedure. Complications were noted in both groups of patients.

RESULTS

A total of 44 patients with lymphoedema involving the upper and lower limbs were followed up during the study period of ten years between January 2013 and Dec 2022. The mean age for the patients in the SMN was 36.4 years with an age range from 15 to 65 years while for the SCN group was 36.7 years with a range from 13 to 69 years. The average circumference of the thigh for the SCN group was 40.2 cm and 39.4 cm for the SMN group with percentage reduction at one year of follow up of 21.9 and 22.6 % respectively. For the patients whose recipient site was in the popliteal fossa the circumference reduction was 23.2 and 23.4 % for the SCN and SMN groups respectively. Patients whose recipient site was in the distal leg the reduction was 23.3 % for the SCN and 23.4 % for SMN group and 25.8 and 27.3 percent for the SCN and SMN group in patients who had upper limb surgeries. Table 2 and 3 summarizes the above findings. The average surgical time for harvesting submandibular lymph node was 2 hours 14 min and for supraclavicular nodes was 3 hours 19 minutes. The average number of nodes harvested in the submandibular group was 4.5 nodes while for the supraclavicular was 3 .9 nodes .Two patients in the supraclavicular group had to be converted to the submandibular group due to unavailable vascular pedicle. Two patients in the SMN group had marginal mandibular nerve neurapraxia with one patient in the SMN being unhappy with her scar (figure 4). Table 2 summarizes the above findings.)

Table 1: *Patient characteristics and surgical related observations between the two groups*

	Submandibular group (n=24)	Supraclavicular group(n=20)	P value
Mean age	36.4 (15-65)	36.7(13-69)	0.932
Mean duration for harvesting nodes	134 min	199 min	<0.001
Average No of nodes	4.5 nodes	3.9 nodes	0.650
Conversion to alternative sites	0	2 patients	0.571
Nerve related complications	1 patient	0	0.776
Unsightly/hypertrophic scars	1 patient	0	0.776

Table 2: *Outcomes at the two anatomical sites*

Recipient Anatomical location	N	Limb size prior to surgery	Limb size after 6 month cm	Limb size at 1 year(cm)	Total reduction in size (cm)%	P values
Upper thigh	16	40.2	31.9	31.2	9 (22.4)	0.018
SCN group	7	40.2	31.9	31.4	8.8 (21.9)	0.021
SMN group	9	39.4	31.6	31.2	9.2 (22.6)	0.030
Popliteal fossa	10	38 .6	36.8	36.1	12.5	0.480
SCN group	5	36.6	29.4	28.1	8.5 (23.2)	0.025
SMN group	5	36.8	29.8	28.4	8.4 (22.8)	0.026
Distal leg	6	37 5	28,7	28.0	9.5	0.014
SCN group	3	35.6	28.3	27.2	8.3(23.3)	0.026
SMN group	3	35.8	28. 2	27.1	8.6 (23.4)	0.022
Upper limb recipient	12	26.3	20.4	20.2	6.1	0.096
SCN group	6	26.3	19.7	19.5	6.8 (25.8)	0.066
SMN group	6	26.7	19.5	19.4	7.3 (27.3)	0.050

Table 3: *Comparison between the two groups of patients at one year of follow up*

Anatomical location of the transplanted Nodes	SCN group % reduction N =20	Submandibular group % reduction N = 24	P value
Upper thigh	21.9	22.6	0.842
Popliteal region	23.2	22.8	0.909
Distal leg	22.3	23.4	0.755
Upper limb	25.8	27.3	0.670

DISCUSSIONS

Management of early lymphedema has largely been by conservative means such as prolonged compression therapy and skin care to prevent ulcerations and infection. Established lymphedema on the other hand has traditionally been managed by debulking procedures such as modified Charlies procedure, buried dermal skin flaps and or liposuction .(2) These management strategies have however resulted in suboptimal results leading to a need to refine the treatments further. Modified Charles procedure for example has been associated with inferior aesthetic outcomes. Further the grafted wounds after excisions are generally unstable and could keep on breaking leading to prolonged hospital stay or outpatient visits. .

With the advent of physiological procedures to manage lymphoedema in the last few decades better functional and aesthetic outcomes have been reported (15,16). These procedures have mainly been lympho lymphatic, lymphactico venous and vascularized lymphnode transfer. The procedures could be in isolation or in combination. There indications are however not uniform and one therefore needs to select the appropriate procedure for the patient.

Vascularized lymph node transplant entails free transfer of lymphnode tissues with surrounding adipofascial tissues that is rich with lymphatic vessels .These tissues have the ability to integrate into the recipient tissue and provide the much needed avenue for lymphatic fluid absorption . Though not clear on how the transplanted nodes work two school of thoughts have emerged with one suggesting that the harvested nodes leads to lymphagiogenesis of new lymphatic vessels while the other suggests that lymph nodes creates physiological lymphatic venous shunts that aids in sapping lymphatic fluid into the venous system. This is aided by a pump mechanism created by the arterial venous pressure differences (17-22)

In our study we have demonstrated that there was no difference in the outcome of patients treated by nodes either from supraclavicular or submandibular groups. Further the anatomical recipient of the nodes whether proximal or distal didn't appear to interfere

with the outcomes. The only significant difference was that harvesting sub-mandibular nodes were faster than supraclavicular group of nodes. In addition sub-mandibular vasculature was more consistent compared to the supraclavicular groups. Similar findings were demonstrated by Ciudad *et al* who showed that anatomical location of the nodes didn't affect the final results in the management of patients with lymphoedema (15).

In conclusion vascularized lymph node transplant has a positive role in the management of patients with lymphoedema irrespective of the donor site and the recipient site. Both submandibular and supraclavicular sites could be used. It is however easier and faster to harvest nodes from the submandibular donor site compared to the supraclavicular site.

REFERENCE

1. Shesol B F, Nakashima R, Alavi A, Hamilton R W. Successful lymph node transplantation in rats, with restoration of lymphatic function. *Plast Reconstr Surg*. 1979;**63(06):**817–823. [PubMed] [Google Scholar]
2. Chang D W, Masia J, Garza R, III, Skoracki R, Neligan P C.Lymphedema: Surgical and Medical Therapy *Plast Reconstr Surg* 2016138(3, Suppl):209S–218S. [PubMed] [Google Scholar]
3. Gratzon A, Schultz J, Secrest K, Lee K, Feiner J, Klein R D. Clinical and psychosocial outcomes of vascularized lymph node transfer for the treatment of upper extremity lymphedema after breast cancer therapy. *Ann Surg Oncol*. 2017;**24(06):**1475–1481. [PubMed] [Google Scholar]
4. Dionyssiou D, Demiri E, Tsimponis A et al. A randomized control study of treating secondary stage II breast cancer-related lymphoedema with free lymph node transfer. *Breast Cancer Res Treat*. 2016;**156(01):**73–79. [PubMed] [Google Scholar]
5. Schaverien MV, Badash I, Patel KM, Selber JC, Cheng MH. Vascularized Lymph Node Transfer for Lymphedema. Semin Plast Surg. 2018 Feb;32(1):28-35. doi: 10.1055/s-0038-1632401. Epub 2018 Apr 9. PMID: 29636651; PMCID: PMC5891655.
6 Vignes S, Blanchard M, Yannoutsos A, Arrault M. Complications of autologous lymph-node transplantation for limb lymphoedema. *Eur J Vasc Endovasc Surg*. 2013;**45(05):**516–520. [PubMed] [Google Scholar.
7. Ciudad P, Manrique O J, Date S et al. Double gastroepiploic vascularized lymph node tranfers to middle and distal limb for the treatment of lymphedema. *Microsurgery*. 2017;37(07):771–779. [PubMed] [Google Scholar]
8. Ciudad P, Date S, Lee M H et al. Robotic harvest of a right gastroepiploic lymph node flap. *Arch Plast Surg*. 2016;**43(02):**210–212. [PMC free article] [PubMed] [Google Scholar]
9. Coriddi M, Skoracki R, Eiferman D. Vascularized jejunal mesenteric lymph node transfer for treatment of extremity lymphedema. *Microsurgery*. 2017;**37(02):**177–178. [PubMed] [Google Scholar]
10. Scaglioni M F, Arvanitakis M, Chen Y-C, Giovanoli P, Chia-Shen Yang J, Chang E I.Comprehensive review of vascularized lymph node transfers for lymphedema: outcomes and complicationsMicrosurgery 2016 [PubMed
11. Ciudad P, Maruccia M, Socas J et al. The laparoscopic right gastroepiploic lymph node flap transfer for upper and lower limb lymphedema: technique and outcomes. *Microsurgery*. 2017;37(03):197–205. [PubMed] [Google Scholar
12. Bank J, Chang D W. Philadelphia, PA: Elsevier; 2016. Microsurgical procedures: vascularized lymph node transfer from the supraclavicular region. Principles and Practice of Lymphedema Surgery; pp. 148–154. [Google Scholar]
13. Mardonado A A, Chen R, Chang D W. The use of supraclavicular free flap with vascularized lymph node transfer for treatment of lymphedema: A prospective study of 100 consecutive cases. *J Surg Oncol*. 2017;115(01):68–71.
14. Sapountzis S, Singhal D, Rashid A, Ciudad P, Meo D, Chen H C. Lymph node flap based on the right transverse cervical artery as a donor site for lymph node transfer. *Ann Plast Surg*. 2014;**73(04):**398–401. [PubMed] [Google Scholar]
15. Ciudad P, Agko M, Perez Coca JJ, Manrique OJ, Chang WL, Nicoli F, Chen SH, Chen HC. Comparison of long-term clinical outcomes among different vascularized lymph node transfers: 6-year experience of a single center's approach to the treatment of lymphedema. *J Surg Oncol*. 2017 Nov;**116(6):**671-682. doi: 10.1002/jso.24730. Epub 2017 Jul 10. PMID: 28695707
16. Raju A, Chang D W. Vascularized lymph node transfer for treatment of lymphedema: a comprehensive literature review. *Ann Surg*. 2015;**261(05):**1013–1023. [PubMed] [Google Scholar
17. Patel K M, Lin C Y, Cheng M H. From theory to evidence: long-term evaluation of the mechanism of action and flap integration of distal vascularized lymph node transfers. *J Reconstr Microsurg*. 2015;**31(01):**26–30. [PubMed] [Google Scholar]
18. Suami H, Scaglioni M F, Dixon K A, Tailor R C. Interaction between vascularized lymph node transfer and recipient lymphatics after lymph node dissection-a pilot study in a canine model. *J Surg Res*. 2016;**204(02):**418–427. [PMC free article] [PubMed] [Google Scholar]
19. Ito R, Zelken J, Yang C Y, Lin C Y, Cheng M H. Proposed pathway and mechanism of vascularized lymph node flaps. *Gynecol Oncol*. 2016;**141(01):**182–188. [PubMed] [Google Scholar]
20. Cheng M H, Huang J J, Wu C W et al. The mechanism of vascularized lymph node transfer for lymphedema: natural lymphaticovenous drainage. *Plast Reconstr Surg*. 2014;**133(02):**192e–198e. [PubMed] [Google Scholar]
21. Yan A, Avraham T, Zampell J C, Aschen S Z, Mehrara B J. Mechanisms of lymphatic regeneration after tissue transfer. *PLoS One*. 2011;**6(02):**e17201. [PMC free article] [PubMed] [Google Scholar]
22. Aschen S Z, Farias-Eisner G, Cuzzone D A et al. Lymph node transplantation results in spontaneous lymphatic reconnection and restoration of lymphatic flow. *Plast Reconstr Surg*. 2014;**133(02):**301–310. [PMC free article] [PubMed] [Google Scholar]

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ABDOMINAL FLAP: A VIABLE OPTION IN RECURRENT PEDIATRIC POST-BURN ELBOW CONTRACTURE RECONSTRUCTION
R. K. Kamundi, MBChB, MMed, **R. M Kyalo**, MBChB,MMed, Department of Surgery, Faculty of Health Sciences, University of Nairobi, **C. Otieno**, BDS, MDS-MOFS. **S. W. Guthua**, BDS, MMed.sc, DOMS,FIAOMS, FCS, FICD, Professor, Oral and Maxillofacial Surgery, University of Nairobi, Nairobi,Kenya and **S.O Khainga**, MBChB, MMed, Professor, Department of Surgery, Faculty of Health Sciences, University of Nairobi.

Corresponding author: Dr. Reuben Kangangi Kamundi, Department of Surgery, Faculty of Health Sciences, University of Nairobi. Email: benkamundi@gmail.com

ABDOMINAL FLAP: A VIABLE OPTION IN RECURRENT PEDIATRIC POST-BURN ELBOW CONTRACTURE RECONSTRUCTION

R. K. KAMUNDI, R. M KYALO, C. OTIENO, S. W. GUTHUA and S.O KHAINGA

SUMMARY

The management of post-burn contractures and keloid formation in pediatric populations pose significant challenges. This case report presents the comprehensive management of recurrent post-burn contracture involving the left elbow. An 11-year-old female presented with recurrent post-burn left elbow flexion contracture for 8 years. Contracture release surgery followed by reconstruction with an abdominal flap was done. Moreover, the patient underwent intermittent nocturnal splinting and physiotherapy sessions. Following, these interventions, the elbow range of motion improved by approximately 80 degrees. A multidisciplinary approach involving surgical and rehabilitative therapies is important in management of post-burn contractures.

Keywords: **Pediatric burns, post-burn contracture, keloid formation, surgical reconstruction, multidisciplinary care.**

INTRODUCTION

Pediatric burns are devastating due to the delicate nature of children's skin and their increased vulnerability to complications such as infections, hypertrophic scarring, and contractures (1) particularly as sequelae of burns in children in whom the psychologic burden and skin characteristics differ substantially from adults. Prevention of hypertrophic scars and keloids after burns is currently the best strategy in their management to avoid permanent functional and aesthetical alterations. Several actions can be taken to prevent their occurrence, including parental and children education regarding handling sources of fire and flammable materials, among others. Combination of therapies is the mainstay of current burn scar management, including surgical reconstruction, pressure therapy, silicon gels and sheets, and temporary garments. Other adjuvant therapies such as topical imiquimod, tacrolimus, and retinoids, as well as intralesional corticosteroids, 5-fluorouracil, interferons, and bleomycin, have been used with relative success. Cryosurgery and lasers have also been reported as alternatives. Newer treatments aimed at molecular targets such as cytokines, growth factors, and gene therapy, currently in developing stages, are considered the future of the treatment of postburn hypertrophic scars and keloids in children.According to recent research, between 23% and 54% of hospitalized burn patients get scar contractures (2). Burn-related skin contractures are more likely to occur following primary excision and skin grafting of deep burns (3).

A shorter and unusually compact scar tissue following burn injury is frequently the result of improper initial care, atypical scar tissue remodeling, or a lack of physical therapy (2). Scar contractures may restrict movement when they involve joints of the extremities (3). After burn scar contractures develop, rehabilitation and surgery is frequently necessary to preserve the affected joint's range of movement and function (4).

Surgical reconstructive techniques for burn scar contracture release include the use of either skin grafting or skin flap. Of the two techniques, skin grafting is by far the more common in the treatment of post-burn contractures (4). However, evidence regarding the effectiveness of either technique is inadequate thus posing a great challenge in developing a standardized treatment algorithm (5). A previous review reported that perforator flaps had better outcomes compared to full-thickness skin grafts (FTSG). Nevertheless, the review identifies the need for research focusing on preferred type of perforator flap depending on the location of the contractures (4). Based on the foregoing, we report a case of an 11-year-old female who presented with post-burn scarring of the left upper limb and chest with consequent elbow

contracture that was successfully managed with an abdominal flap.

CASE PRESENTATION

An 11-year-old female from Thiba, Mwea, Kenya, presented with a history of scald burns sustained eight years ago. The burns occurred when hot tea spilled from a boiling pot, resulting in scald injuries to the left upper limb, axilla, and chest. Initial management at a local facility involved cleaning and wound dressing, which led to wound healing but with significant scarring and the development of a left elbow contracture (Figure 1).

Figure 1: *Post-burn contracture of the left elbow with hypertrophic scars of the forearm, arm and chest in the 11-year-old female*

Despite undergoing contracture release surgery, which involved excision of scar tissue and release of contracture followed by FTSG, the contracture recurred. Three years following the initial injury, the patient was referred again for management of the contracture.

Upon the second presentation, the patient was in fair general condition with no evidence of pallor, jaundice, dehydration, lymphadenopathy, or edema. Vital signs were within normal limits. Physical examination revealed a left elbow scar with contracture limiting maximum extension to 60 degrees. Hypertrophic scars were noted on the left hand, elbow, left breast, and axillary region. The patient had no apparent developmental delays.

The treatment plan involved left elbow contracture release and reconstruction using an abdominal flap. The procedure was performed successfully in two stages: contracture release plus raising and insetting of the flap was done first, and the flap was left attached to its base to continue receiving blood supply from its source vessels. Flap donor site was grafted using a split-thickness skin graft (STSG). After three weeks, the flap was divided from its base (Figure 2) and the flap insetting was completed (Figure 3). A tissue expander procedure was planned to achieve primary closure of the donor site without the need for skin grafting which was done when the flap was raised.

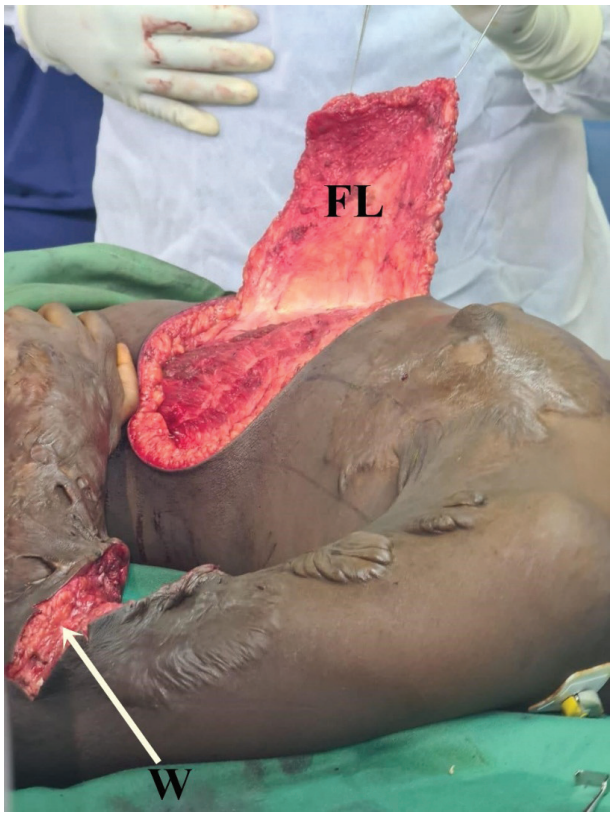

Figure 2: *The abdominal flap (FL) after it has been raised ready to be inset into the wound (W)*

Postoperatively, the patient commenced a 10-month physiotherapy program to optimize functional outcomes and prevent contracture recurrence. The program also involved intermittent nocturnal splinting. Although the scar tissue at the elbow was excised, achieving adequate elbow extension required addressing the shortened soft tissue structures. These structures needed gradual lengthening to avoid immediate postoperative damage. Physiotherapy facilitated this gradual extension and improved muscle function, while splinting maintained the gains achieved. This comprehensive approach ensured a gradual and safe restoration of mobility and function (Figure 4 a).

Figure 3: *Post-surgical image of the contracture release with abdominal flap reconstruction*

The patient experienced mild complications including pain at the scar sites (left elbow and abdomen) and abdominal "muscle pull" on short-term review (Figure 4b). Additionally, however, the patient reported severe and intermittent itching, with subsequent bruising after scratching on long-term review. Physical examination revealed keloids at the scar sites, characterized by hyperkeratosis on the skin flap and gross hypertrophic scarring extending from the distal phalangeal area of the left hand to mid-humeral region. Management of the keloids included the application of creams for wound care, along with triamcinolone injections.

Figure 4 (a, b): *The patient's elbow and forearm a few months post-surgery(left) showing hyperkeratosis on the skin flap and extensive scarring. The same elbow 2 years post-surgery with markedly reduced hyperkeratosis and scarring (right). The flap donor site 2 years post-surgery with extensive scarring.*

Throughout the course of treatment, the patient remained under close observation and received multidisciplinary care involving plastic surgeons, physiotherapists, and wound care specialists. Post-treatment, the patient exhibited significant improvements in functionality. Following the surgical intervention, physiotherapy, and splinting, the patient achieved an elbow extension of approximately 140 degrees. This functional recovery allowed her to perform daily activities with greater ease. Regular follow-up assessments were conducted to monitor progress, address complications, and adjust treatment strategies as needed.

DISCUSSION

The patient sustained the burn injury at a very young age and developed a severe contracture that persisted despite initial surgical intervention. Despite undergoing contracture release and FTSG, the patient experienced contracture reformation. This finding aligns with previous studies highlighting the high recurrence rates of post-burn contractures that have been noted in pediatric populations (3,6)the authors identified 48 articles published since 1965 and written in English which reported the incidence and risk factors for hypertrophic scarring or assessed outcomes related to scarring. Most studies had important methodological limitations limiting the generalizability of the findings. In particular, the absence of standardized valid measures of scarring and other outcome variables was a major barrier to drawing strong conclusions. Among studies on hypertrophic scarring, the prevalence rate varied between 32 and 72%. Identified risk factors included dark skin, female gender, young age, burn site on neck and upper limb, multiple surgical procedures, meshed skin graft, time to healing, and burn severity. With regard to psychosocial outcomes, two studies compared pediatric burn survivors with a nonburn comparison group on a body image measure; neither study found differences between groups. Across studies, burn severity and location had a modest relationship with psychosocial outcome variables. Psychosocial variables such as social comfort and perceived stigmatization were more highly associated with body image than burn characteristics. To advance our knowledge of the epidemiology of scars and the burden of scars, future studies need to implement more rigorous methodologies. In particular, standardized valid measures of scarring and other outcomes should be developed. This process could be facilitated by an international collaboration among burn centers. Recurrence of post-burn contractures, following inadequate management of post-burn contractures (PBC). Factors contributing to recurrence include incomplete release of scar tissue, inadequate postoperative rehabilitation and the presence of underlying scar contracture mechanisms (6)following inadequate management of post-burn contractures (PBC. The recurrence of the contracture highlights the complexity of managing post-burn sequelae in pediatric patients.

The management of post-burn contractures often involves scar excision, release of contracture, and tissue reconstruction (7)leading to significant functional impairment and costs. Effective prevention and treatment strategies are necessary to decrease morbidity and unnecessary costs. This scoping review aimed to summarize prevention and treatment strategies used for management of burn scar contractures published in the literature since 2000. A comprehensive PubMed review was performed in October 2022 to identify methods of burn contracture prevention and treatments. Non-English, duplicate, and unavailable articles were excluded. Data were extracted including publication year, techniques, and outcomes. A total of 327 publications met criteria for inclusion. Most articles were published in 2011 (n = 22. The source of skin flap used in the reconstruction of post-burn contracture varies with contracture location (8)frequently with persistent wounds. Proper planning and tissue selection are essential to minimize donor site morbidity optimizing outcomes. The principle of burn reconstructive surgery requires that the defects after release should be replaced with donor tissues which have matching texture and color as well as enough pliability. Autologous skin grafting or flap surgeries meet these criteria to replace scar tissues and resurface the subsequent to post-released scar defects. Despite the benefits, the use of flaps is often limited in burn patients for many reasons. If a surgeon intends to release completely and reconstruct in one-stage operation, a large defect may result in large donor site morbidity, necessitating flap surgery including free flap surgery. A lot of different methods and procedures are available for resurfacing the defects, and these are reviewed. In this article, algorithms for the release of burn contractures and reconstructive methods are presented. These treatment algorithms should aid in achieving significant improvement in both joint motions and aesthetic deformities. In a previous review , fasciocutaneous island flaps with proximal septal perforators of the radial artery were most commonly used in antecubital contractures (4). Moreover, another review reported latissimus dorsi to be the most utilized flap overall in covering the defect in the elbow region. While the same review also describes studies on abdominal flaps used in reconstruction of elbow defects, their review fails to mention the cause of the elbow defects (9).

In this case, the use of an abdominal flap for reconstruction following contracture release proved to be a viable option, allowing for adequate tissue coverage and functional restoration. The abdominal flap was selected due to several key advantages over a free flap, such as donor site availability, vascularity, and the need for durable tissue coverage to prevent recurrence. The abdominal flap, particularly the pedicled type, offers robust vascularity and a substantial tissue volume, essential for covering large defects and ensuring reliable healing. This flap is anchored to its blood supply, reducing the risk of vascular compromise compared to free flaps, which require microvascular anastomosis. Hence although free flap surgery remains the gold standard in the reconstruction ladder, it was not considered a good option in this specific case due to possibility of distorted anatomy of the blood vessels secondary to the contracture. While flap reconstruction has demonstrated efficacy in addressing post-burn contractures, its success depends on various factors, including patient characteristics, wound location, and surgeon expertise (8)frequently with persistent wounds. Proper planning and tissue selection are essential to minimize donor site morbidity optimizing outcomes. The principle of burn reconstructive surgery requires that the defects after release should be replaced with donor tissues which have matching texture and color as well as enough pliability. Autologous skin grafting or flap surgeries meet these criteria to replace scar tissues and resurface the subsequent to post-released scar defects. Despite the benefits, the use of flaps is often limited in burn patients for many reasons. If a surgeon intends to release completely and reconstruct in one-stage operation, a large defect may result in large donor site morbidity, necessitating flap surgery including free flap surgery. A lot of different methods and procedures are available for resurfacing the defects, and these are reviewed. In this article, algorithms for the release of burn contractures and reconstructive methods are presented. These treatment algorithms should aid in achieving significant improvement in both joint motions and aesthetic deformities.

The development of keloids represents a common complication in scar management in dark-skinned patients. Keloid formation results from aberrant wound healing processes with excessive collagen deposition and uncontrolled fibroblast proliferation (10). In this case, the patient exhibited keloids with hyperkeratosis and itching, necessitating creams and triamcinolone injections. While these interventions may provide symptomatic relief and flatten keloids, their long-term efficacy remains variable (1) particularly as sequelae of burns in children in whom the psychologic burden and skin characteristics differ substantially from adults. Prevention of hypertrophic scars and keloids after burns is currently the best strategy in their management to avoid permanent functional and aesthetical alterations. Several actions can be taken to prevent their occurrence, including parental and children education regarding handling sources of fire and flammable materials, among others. Combination of therapies is the mainstay of current burn scar management, including surgical reconstruction, pressure therapy, silicon gels and sheets, and temporary garments. Other adjuvant therapies such as topical imiquimod, tacrolimus,

and retinoids, as well as intralesional corticosteroids, 5-fluorouracil, interferons, and bleomycin, have been used with relative success. Cryosurgery and lasers have also been reported as alternatives. Newer treatments aimed at molecular targets such as cytokines, growth factors, and gene therapy, currently in developing stages, are considered the future of the treatment of postburn hypertrophic scars and keloids in children.

CONCLUSION

A multidisciplinary approach involving surgical and rehabilitative therapies is essential in the management of post-burn contractures. Despite the failure of the initial reconstructive procedure that utilized a FTSG and the subsequent success in using an abdominal flap, it cannot be concluded that flaps are superior to grafts in post-burn contractures due to the limited nature of evidence from a case report. Therefore, larger case series on the use of abdominal flaps in the management of elbow contractures and studies comparing the efficacy of various flaps as well as flaps versus grafts in the management of elbow contractures are needed.

REFERENCES

1. Berman B, Viera M, Amini S, Huo R, Jones I. Prevention and Management of Hypertrophic Scars and Keloids After Burns in Children. *The Journal of Craniofacial Surgery.* 2008 Jul 1;**19:**989–1006.
2. Oosterwijk AM, Mouton LJ, Schouten H, Disseldorp LM, van der Schans CP, Nieuwenhuis MK. Prevalence of scar contractures after burn: *A systematic review. Burns.* 2017 Feb;**43(1):**41–9.
3. Lawrence J, Mason S, Schomer K, Klein M. Epidemiology and Impact of Scarring After Burn Injury. Journal of burn care & research : O*fficial publication of the American Burn Association.* 2011 Dec 1;**33:**136–46.
4. Lewinson RT, Capozzi LC, Johnson K, Harrop AR, Fraulin FOG, Nickerson D. A Review of Perforator Flaps for Burn Scar Contractures of Joints. *Plast Surg (Oakv).* 2019 Feb;**27(1):**66–77.
5. Stekelenburg CM, Marck RE, Tuinebreijer WE, de Vet HC, Ogawa R, van Zuijlen PP. A systematic review on burn scar contracture treatment: searching for evidence. *Journal of Burn Care & Research.* 2015 May 1;**36(3):**e153-61.
6. Balumuka DD, Galiwango GW, Alenyo R. Recurrence of post burn contractures of the elbow and shoulder joints: experience from a ugandan hospital. BMC Surg. 2015 Sep 9;**15:**103.
7. Raborn LN, Janis JE. Prevention and Treatment of Burn Scar Contracture: A Practical Review. *Plast Reconstr Surg Glob Open.* 2024 Jan 19;**12(1):**e5333.
8. Hayashida K, Akita S. Surgical treatment algorithms for post-burn contractures. *Burns & Trauma.* 2017 Dec 1;5.
9. Berköz Ö, Aydın HU. Distant Pedicled Flaps for Elbow Coverage-a Systematic Review. *Sağlık Bilimlerinde İleri Araştırmalar Dergisi.* 2020 Oct 7;**3(2):**72–80.
10. Nangole FW, Agak GW. Keloid pathophysiology: fibroblast or inflammatory disorders? *JPRAS* Open. 2019 Dec;**22:**44–54.

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GRACILIS MUSCLE SPHINCTEROPLASTY FOLLOWING ABDOMINOPERINEAL RESECTION: A CASE REPORT
Oduor PR, Reconstructive Surgeon and Senior Lecturer, Department of Surgery, Faculty of Health Sciences, Egerton University, **Mugo P** and **Muthomi K**, Medical students, Faculty of Health Sciences, Egerton University.

GRACILIS MUSCLE SPHINCTEROPLASTY FOLLOWING ABDOMINOPERINEAL RESECTION: A CASE REPORT

P. R. ODUOR, P MUGO and K. MUTHOMI

SUMMARY

Abdominoperineal resection (APR) is one of several surgical procedures indicated for treating colorectal carcinoma. APR involves the removal of the distal colon, the rectum, and the anal sphincters, resulting in a permanent colostomy. Permanent colostomies are associated with multiple complications including a low quality of life. Anal reconstruction, using the gracilis muscle for sphincter control is a viable alternative to a permanent colostomy.

This is the case of a 43-year-old woman who requested the reversal of a permanent colostomy. She had a Hartman's colostomy fashioned after undergoing an abdominoperineal resection and total abdominal hysterectomy for a suspected colorectal carcinoma. On her request, colostomy reversal and gracilis muscle sphincteroplasty were performed. Eight months after the procedure, she achieved good continence, improved feeding, and gained about 13 kilograms in weight. The successful colostomy reversal and gracilis sphincteroplasty demonstrated the effectiveness of graciloplasty in restoring patients' continence.

CASE PRESENTATION

A 43-year-old woman presented with a wish to have a permanent colostomy reversed. The woman had a Hartman's colostomy port that was created after undergoing an abdominoperineal resection and total abdominal hysterectomy for a suspected colorectal carcinoma. The diagnosis was based on a history of abdominal pain and inability to pass stool. A colonoscopy revealed a non-ulcerated polypoid mass causing partial obstruction at the rectosigmoid junction. Biopsy and subsequent histopathology indicated normal colonic mucosa, but no signs of malignancy. The diagnosis was further supported by features of malignancy on abdominopelvic CT scan with a staging of T2-3, N1, M0.

Consequently, the patient underwent abdominoperineal resection, a total abdominal hysterectomy, and a permanent colostomy was fashioned. Histopathology of the resected colon, rectum, anus, and the uterus revealed extensive endometriosis and no signs of malignancy.

The plan was to pull the distal colon to the perineum and use the gracilis muscle flap to reconstruct the sphincter. The procedure was described in detail to the patient including the possibility of continence failure. The patient decided to proceed with the surgery and informed consent was obtained. The surgery was performed with the patient under general anesthesia and in lithotomy position.

Intraoperative findings included a Hartman's colostomy and an absent anal opening with no anal sphincter tone (Figures 1 and 2). First, a laparotomy was performed and adhesions in the pelvis were released. The stoma was mobilized into a new anal opening and sutured in place. The left gracilis muscle was identified, (Figure 3) detached distally and wrapped around the new anus in an anticlockwise direction and its tendon was stitched to the periosteum of the ipsilateral inferior pubic ramus with the thigh adducted. This created a sling around the neo-anus. Throughout the procedure, care was taken to prevent twisting of the muscle. An index finger inserted into the neo-anus had the sensation of being firmly gripped. Hemostasis was achieved before wound closure. The abdomen was closed in layers. The donor site for the gracilis muscle was closed and dressing was performed.

While in the ward the patient was positioned with lower limbs adducted at all times.

Figure 1: *Intraop findings, Hartman's colostomy*

Figure 2: *Intraop findings, absent anal opening*

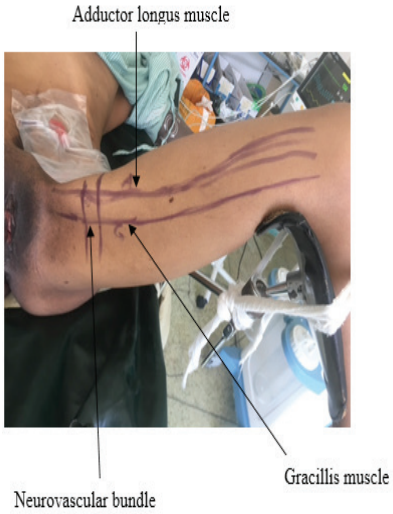

Figure 3: *Marking of the left gracilis muscle donor site*

RESULTS

She had a good post-operative outcome. While in the ward she had some perianal soiling but with a reasonable stool control and was discharged home on day 7 post-surgery.

At 4 weeks post-surgery, stool control was improving but with occasional soiling. Continence improved such that by 4 months she was continent for both flatus and stool.

At 8 months she had achieved good continence and we decided to assess her continence objectively using the Vaizey continence score (1). She scored 2/24; (Table 1) the 2 points were due to occasional incontinence to liquid stool. She reported an improvement in her quality of life with a weight gain of 13 kilograms from the time of surgery.

Table 1: *The Vaizey continence score at 8 months (1)*

Incontinent	Never	Rarely	Sometimes	Weekly	Daily
Incontinent for solid stool	0	0	0	0	0
Incontinent for liquid stool	0	0	**2**	0	0
Incontinent for gas	0	0	0	0	0
Alterations in lifestyle	0	0	0	0	0
		No		Yes	
Need to wear pad or plug		0		0	
Taking constipation medication		0		0	
Lack of ability to defer defecation for 15 mins		0		0	
Total Score			2		

Never: no episodes in the past 4 weeks; **Rarely**: 1 episode in the past 4 weeks; **Sometimes:** >1 episode in the past 4 weeks, but <1 a week; **Weekly:** 1 or more episodes a week but <1 a day; Daily: 1 or more episodes a day

DISCUSSION

Aggressive surgical treatment is indicated in the management of colorectal carcinoma. Abdominoperineal resection (APR) is one of the surgical options and is indicated for low-lying rectal carcinomas within 5cm of the anal verge. In APR, the distal colon, the rectum, and the anal sphincters are removed resulting in a permanent colostomy (2).

It is not uncommon for intestinal endometriosis to mimic colorectal carcinoma. Kim et al reported five cases of misdiagnosis; intestinal endometriosis presented with colonoscopy and radiologic findings similar to those observed in colorectal carcinoma. Histopathology results of the surgical specimens however revealed endometrial tissue (3). In this case, both the CT imaging results and colonoscopy examination pointed to colorectal carcinoma as the most probable diagnosis although the biopsy results were inconclusive of malignancy. Histopathology of the surgical specimens revealed endometrial tissue and no malignancy. The results of this case and previous reports by Kim et al highlight the need to consider endometriosis as a differential in reproductive women presenting colorectal carcinoma-like symptoms.

Although APR often requires the fashioning of a permanent colostomy, colostomies are less than ideal. They lower the quality of life by creating a negative sense of body image, affecting emotional well-being and overall mental health. Additionally, colostomies are associated with complications such as peristomal infections and ischemia of the colostomy (4). In this case, the patient's main concern was the permanent colostomy affecting her quality of life thus influencing her to request for a reversal.

Cases of reversal of permanent colostomies after APR have been documented. Puerta Diaz et al reported successful reversal of permanent colostomies in seven patients. The seven patients had undergone APR due to rectal adenocarcinoma. The sigmoid colon was anastomosed to the perineum and sphincteroplasty was performed by transposing the gluteus maximus muscle. The outcome was excellent sphincter function in four of the seven patients (5). In similar cases involving anorectal reconstruction and sphincteroplasty, graciloplasty has been widely applied. High success rates of 42% to 85% have been reported with graciloplasty (6). In the long term, stimulated graciloplasty has proven cost-effective compared to permanent colostomy (7).

In this case, the sigmoid colon was pulled down to create the neo-anus. Sphincteroplasty involves the transposition of the gracilis muscle. Continence improved in the weeks and months following the procedure. Eight months postoperatively, the patient had achieved remarkable continence and had a Vaizey continence score of 2/24. The reversal procedure had a positive impact on the patient's quality of life as evidenced by the self-reported improvement in feeding and the 10 kilograms weight gain observed 8 months after the procedure was performed.

The main challenge is injury to the branch of the obturator nerve during the procedure. The limitations of the procedure is in relation to the training of the transferred muscle and the occasional necessity for transanal stimulation.

In conclusion, the successful colostomy reversal and gracilis sphincteroplasty demonstrated the effectiveness of graciloplasty in restoring patients' continence. This is better than a permanent colostomy following the APR procedure. Patients record an improvement of their quality of life after permanent colostomy reversal procedure. Gracilis sphincteroplasty should be considered in patients who are not comfortable with a permanent colostomy.

REFERENCES

1. Bols EMJ, Hendriks HJM, Berghmans LCM, Baeten CGMI, de Bie RA. Responsiveness and interpretability of incontinence severity scores and FIQL in patients with fecal incontinence: a secondary analysis from a randomized controlled trial. *Int Urogynecology J*. 2013 Mar;**24(3):**469–78.
2. Perry WB, Connaughton JC. Abdominoperineal Resection: How Is It Done and What Are the Results? *Clin Colon Rectal Surg*. 2007 Aug;**20(3)**:213.
3. Kim JS, Hur H, Min BS, Kim H, Sohn SK, Cho CH, et al. Intestinal Endometriosis Mimicking Carcinoma of Rectum and Sigmoid Colon: A Report of Five Cases. *Yonsei Med J*. 2009 Oct 31;**50(5):**732–5.
4. Chivate SD, Chougule VA. New Rectal Construction After Abdominoperineal Resection for Carcinoma Rectum. *Indian J Surg*. 2012 Apr;**74(2):**166–71.
5. Puerta Díaz JD, Castaño Llano R, Lombana LJ, Restrepo JI, Gómez G. Use of the gluteus maximus muscle as the neosphincter for restoration of anal function after abdominoperineal resection. *Tech Coloproctology*. 2013 Aug 1;**17(4):**425–9.
6. Cera SM, Wexner SD. Muscle Transposition: Does It Still Have a Role? *Clin Colon Rectal Surg*. 2005 Feb;**18(1):**46–54.
7. Rongen MJGM, Uludag O, El Naggar K, Geerdes BP, Konsten J, Baeten CGMI. Long-term follow-up of dynamic graciloplasty for fecal incontinence. *Dis Colon Rectum*. 2003 Jun; **46(6):**716–21.

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IMPLANT-BASED LEFT BREAST RECONSTRUCTION IN POLAND SYNDROME: A CASE REPORT
K. Chesoni, **D. Nyairo**, **W Adegu** and **F. Nang'ole**, Department of Plastic and Reconstructive and Aesthetic Surgery, University of Nairobi, Kenya

Address for correspondence: Dr. Chesoni Kevin, Department of Plastic and Reconstructive and Aesthetic Surgery, University of Nairobi, Kenya. E-mail: chesonik@gmail.com

IMPLANT-BASED LEFT BREAST RECONSTRUCTION IN POLAND SYNDROME: A CASE REPORT

K. CHESONI, D. NYAIRO, W ADEGU and F. NANG'OLE

SUMMARY

Introduction: **Poland syndrome is a rare congenital condition characterized by unilateral absence or underdevelopment of the pectoralis muscle and breast tissue, resulting in significant breast asymmetry and psychological distress. This report presents a 21-year-old female with Poland syndrome who underwent a successful two-stage implant-based breast reconstruction.**

Methodology: **The patient sought correction of breast asymmetry due to an underdeveloped left breast and absent pectoralis muscle. A two-stage reconstruction was performed, starting with the placement of a tissue expander in March 2024. The expander was gradually inflated to 600cc, creating adequate space for the final implant.**

Results: **In June 2024, the tissue expander was replaced with a 500cc silicone implant. A mastopexy was performed on the right breast, and the left nipple was medialized to achieve symmetry. The patient recovered well and was discharged three days postoperatively. Follow-up showed excellent aesthetic results, with the patient reporting high satisfaction and improved self-confidence.**

Conclusion: **This case demonstrates the effectiveness of a staged implant-based approach for breast reconstruction in Poland syndrome. The combined use of a tissue expander, implant placement, and contralateral breast modification achieved satisfactory symmetry and enhanced the patient's quality of life. This method provides a reliable option for addressing breast asymmetry in similar cases.**

Keywords: **Poland Syndrome, Implant-based breast reconstruction, Breast asymmetry**

INTRODUCTION

Poland syndrome is a congenital anomaly first described by Sir Alfred Poland in 1841. It involves the unilateral absence or underdevelopment of the pectoralis major muscle, often associated with ipsilateral breast and nipple abnormalities. The condition varies in severity, from mild hypoplasia to complete lack of chest wall muscles, and may include limb anomalies. Studies suggest a male-to-female ratio of approximately 3**:1**(1). This disparity may be related to differences in genetic susceptibility, though the exact reasons remain unclear. Additionally, the condition more commonly affects the **right side** of the body, with right-sided cases observed in about **75% of individuals**(2).

Implant-based breast reconstruction is a widely used and effective method for restoring breast symmetry in patients with Poland syndrome, particularly for those with limited breast tissue. This approach offers a less invasive option compared to autologous tissue transfer, which requires the harvesting of tissue from other areas of the body. While autologous tissue transfer provides a more natural feel due to the use of the patient's tissue, implants are often preferred for their shorter recovery time, reduced risk of complications, and more predictable cosmetic results. In many cases, implants are also a more suitable choice for patients seeking a less complex and lower-cost solution to address asymmetry(3)

The psychological impact of Poland syndrome can be profound, leading to significant challenges with self-esteem, body image, and social interactions. Patients often struggle with feelings of embarrassment, insecurity, and isolation due to physical asymmetries, which can affect both their personal and professional

lives. These issues may be particularly acute in females, who are more likely to experience emotional distress related to breast asymmetry, often leading to a desire for cosmetic correction. Reconstructive surgery plays a critical role in addressing these concerns by aiming to restore physical symmetry, which can have a positive effect on mental well-being(1).

Patient Presentation:
A 21-year-old female who presented with a noticeable discrepancy in the size of her breast tissue. Her left breast was underdeveloped, and she had an absent pectoralis major muscle, consistent with Poland syndrome. The patient desired a more symmetrical appearance to enhance her self-esteem and body image.

Figure 1: *Shows the breast asymmetry observed in the patient before reconstruction.*

METHODOLOGY

Surgical Plan:
A two-stage reconstructive approach was planned:

Stage One: Insertion of a tissue expander to stretch the skin and create space for the final implant.

Stage Two: Replacement of the tissue expander with a permanent silicone breast implant and a contralateral breast lift to achieve symmetry.

Surgical Procedure:

Stage One: Tissue Expander Placement:
In March 2024, a tissue expander was placed in the left breast. The expander was incrementally inflated over several weeks to a volume of 600cc. This process created adequate space and stretched the overlying skin, preparing it for the final implant.

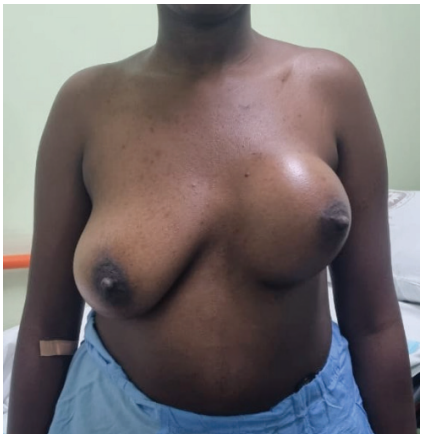

Figure 2: *Depicts the final volume of the tissue expander after incremental inflation.*

Stage Two: Implant Placement and Mastopexy
On June 12, 2024, the tissue expander was removed, and a 500cc silicone breast implant was inserted into the left breast. A mastopexy was performed on the right breast to achieve symmetry, and the left nipple was medialized to a more natural position. The procedure was uneventful, and the patient was discharged three days postoperatively.

Figure 3: *Shows implant placement*

RESULTS

The patient experienced an uneventful recovery and was extremely pleased with the aesthetic outcomes. She reported significantly improved self-confidence and body image at follow-up visits. The reconstructed left breast had a natural contour and symmetry with the right breast, which had been lifted to match.

Figure 4: *Shows results on the 3rd postoperative day.*

DISCUSSION

Poland syndrome presents unique challenges in breast reconstruction due to the absence of the pectoralis muscle and associated chest wall deformities. Various reconstructive options exist, including autologous tissue transfer and implant-based reconstruction.

As demonstrated in this case, implant-based reconstruction involves using a tissue expander to create a pocket for the final implant. This technique allows for gradual skin expansion and accommodation of the desired implant volume. One of the main advantages of implant-based reconstruction is its less invasive nature compared to autologous tissue reconstruction, resulting in shorter operative times and reduced donor-site morbidity(4)

However, implant-based reconstruction has limitations. It may not be suitable for patients with severe chest wall deformities, as implants require adequate soft tissue coverage and support. There is also a risk of implant-related complications, such as capsular contracture or implant rupture(5)

Autologous tissue reconstruction, using the patient's tissues (e.g., latissimus dorsi flap or TRAM flap), can provide a more natural feel and is beneficial in cases with severe chest wall deformities. However, these techniques are associated with longer operative times, increased recovery periods, and potential donor-site complications(6).

A combination of techniques, such as using a latissimus dorsi flap with an implant, may provide additional soft tissue coverage, enhancing the aesthetic outcome. Fat grafting is another option for mild to moderate cases, improving contour and symmetry without the need for implants or extensive surgery(7).Overall, the choice of reconstructive technique should be tailored to the patient's specific anatomy and preferences, balancing the desired aesthetic outcomes and potential risks(4)

CONCLUSION

This case report highlights the effectiveness of a staged implant-based approach in the reconstruction of underdeveloped breasts in Poland syndrome. The use of a tissue expander followed by implant placement, combined with a contralateral breast lift, provided excellent aesthetic results and improved the patient's quality of life. This approach can be considered a valuable option for similar cases, offering a balance between aesthetic outcomes and surgical feasibility.

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Conflicts of interest: There are no conflicts of interest

REFERENCES

1. Baldelli I, Gallo F, Crimi M, Fregatti P, Mellini L, Santi P, et al. Experiences of patients with Poland syndrome of diagnosis and care in Italy: a pilot survey. *Orphanet J Rare Dis.* 2019 Nov 21;**14(1):**269.
2. Poland's Syndrome | WakeMed [Internet]. [cited 2024 Nov 16]. Available from: https://www.wakemed.org/wakemed-physician-practices/specialties/pediatric-surgery/chest-wall-deformity-center/chest-wall-conditions-and-treatments/polands-syndrome
3. Chavoin JP, Taizou M, Moreno B, Leyx P, Grolleau JL, Chaput B. Correcting Poland Syndrome with a Custom-Made Silicone Implant: Contribution of Three-Dimensional Computer-Aided Design Reconstruction. *Plast Reconstr Surg.* 2018 Aug;**142(2):**109e–19e.
4. Mahrhofer M, Schoeller T, Casari M, Bachleitner K, Weitgasser L. Development of A Surgical Treatment Algorithm for Breast Reconstruction in Poland Syndrome Patients Considering Severity, Sex, and BMI. *J Clin Med.* 2021 Jan;**10(19):**4515.
5. Rocha RP, Daher PF, de Souza Pinto EB, Saldaña OR, de Sousa JE, Pacheco RB, et al. Complication After Breast Implantation in Poland Syndrome. Aesthet Surg J. 2008 Sep 1;28(5):589–93.
6. Liu C, Luan J, Ouyang Y, Zhuang Y, Xu B, Chen L, et al. Breast Reconstruction in Poland Syndrome Patients with Latissimus Dorsi Myo Flap and Implant: An Efficient Endoscopic Approach Using Single Transverse Axillary Incision. *Aesthetic Plast Surg.* 2019 Oct 1;**43(5):**1186–94.
7. Delay E, Sinna R, Chekaroua K, Delaporte T, Garson S, Toussoun G. Lipomodeling of Poland's Syndrome: A New Treatment of the Thoracic Deformity. *Aesthetic Plast Surg.* 2010 Apr 1;**34(2):**218–25.

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SENSATE CHIMERIC ANTEROLATERAL THIGH FLAP FOR HEAD AND NECK RECONSTRUCTION FOLLOWING CANCER EXTIRPATION IN A HIV POSITIVE PATIENT: CASE REPORT
Nyairo M.D, **Kerubo L.J**, **Nyabuto C**, **Ogechi J**, **Kiriga M**, **Aswani J**, **Vilembwa A** and **Nangole F.W,** Department of Surgery, University of Nairobi, P.O. Bpx 30197-00100, Nairobi, Kenya.

Corresponding Author: Dr. D. Nyairo, Department of Surgery, University of Nairobi, P.O. Box 30197-00100, Nairobi, Kenya.

SENSATE CHIMERIC ANTEROLATERAL THIGH FLAP FOR HEAD AND NECK RECONSTRUCTION FOLLOWING CANCER EXTIRPATION IN A HIV POSITIVE PATIENT: CASE REPORT

M. D. NYAIRO, L. J. KERUBO, C. NYABUTO, J. OGECHI, M. KIRIGA, J. ASWANI, A. VILEMBWA and F. W. NANGOLE

SUMMARY

Radical tumor ablations in the head and neck area require intricate reconstructive procedures.

This is even more so in the setting of HIV where more advanced disease is observed at presentation resulting in poorer outcomes and increased complications. Free tissue transfer has enabled preservation of function and aesthetics while upholding oncologic surgery principles. The anterolateral thigh (ALT) flap is a very reliable workhorse flap in this regard.

We present a case of a 51-year-old HIV positive male with oral squamous cell carcinoma that was resected and the resultant defect reconstructed with a free, sensate, chimeric anterolateral thigh (ALT) flap. The patient was followed up closely. Initial intensive free flap monitoring and subsequent routine clinical reviews were undertaken. Six-week postoperative review revealed a healthy well incorporated flap that successfully resurfaced both intraoral and cutaneous defects.

A chimeric ALT flap is an excellent choice to resurface both the intraoral and cutaneous defects.

The lateral femoral cutaneous nerve of the thigh can be used to restore sensation in complex through and through cheek defects after oncologic surgery.

Key words: **Chimeric, sensate flap, HIV positive, Head and neck reconstruction**

INTRODUCTION

Head and neck cancer incidence is ranked third of all malignancies in developing nations (1) with oral squamous cell carcinoma being the highest at 40.6% (2,3).

HIV infection is associated with increased incidence, advanced disease and poorer outcomes of these malignancies which necessitates larger, more complex flap designs to achieve cover (4–11).

Chimeric ALT flaps are ideal for defects demanding reconstruction in greater than two dimensions. The lateral femoral cutaneous nerve of the thigh can be utilized for sensory restoration at the recipient site. We present a case of a HIV positive 51-year-old man in whom a sensate chimeric ALT flap was used to resurface a complex face defect after excision of advanced oral squamous cell carcinoma.

Case presentation

51-year-old HIV positive male on HAART for 14 years presented with an exophytic ulcerated oral squamous cell carcinoma involving right cheek and mandible.

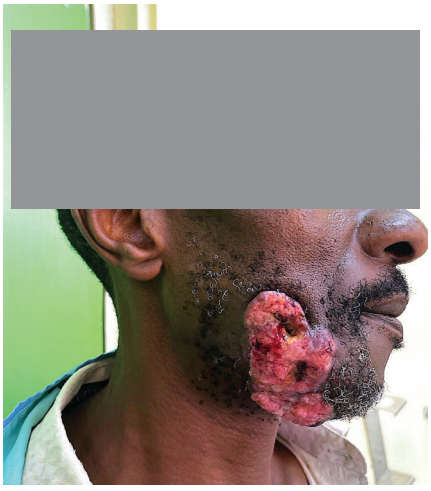

Figure 1: *Preoperative view of the mass.*

The surgery involved right sub-mandibulectomy done at para symphysis level, disarticulation on the right and bilateral lymph node dissection.

The resultant cutaneous defect was approximately 16cm by 12cm and an intraoral defect of 8cm by 4cm.

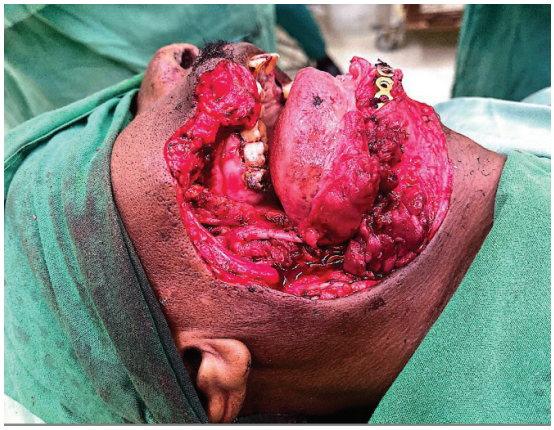

Figure 2: *Resultant through and through cheek defect*

Fasciocutaneous ALT flap was raised with two musculocutaneous perforators then divided to match the defects, each segment with its own perforator.

Figure 3: *(Left to right) the lateral femoral cutaneous nerve of the thigh, ALT flap being retracted, proximal perforator, distal perforator*

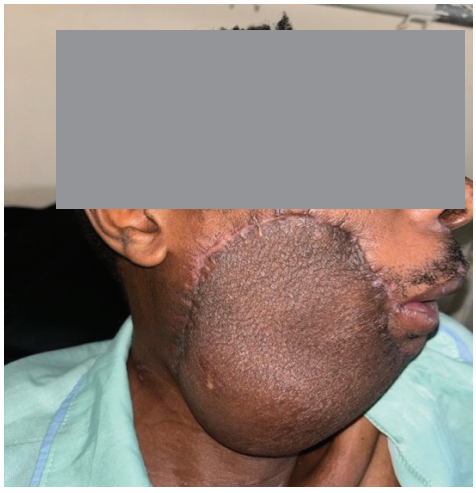

Figure 4: *Patient approximately 6 weeks post-operatively*

DISCUSSION

Since its description by Song et al in 1984 (12), various authors have published on the versatility, vascular anatomic variations, surgical modifications and applications of the ALT flap in head and neck reconstruction (13–17).

ALT flap has good pliability and may be folded for the reconstruction of both the inner and outer lining of through and through cheek defects. The vascular pattern also allows the use of a more versatile design with double skin paddles based on multiple perforators (13,16). It may be raised with vastus lateralis muscle as a myocutaneous flap or combined with adjacent flaps according to the chimeric flap principle, to reconstruct large or complex 3-dimensional defects (17–19).

There is a dearth of knowledge on free flap surgery in patients living with HIV. Studies have reported higher surgical complication rates and flap loss in these patients implicating low CD4 counts, vasculitis, and sepsis as contributing factors (11,20,21). Few studies have demonstrated comparable complication rates between patients with and without HIV (20).

This case report shows that successful complex free flap reconstruction can be undertaken in the setting of HIV with proper patient selection.

CONCLUSION

The ALT flap is highly versatile and offers flexibility in resurfacing complex defects of the head and neck region. It can be raised with the lateral femoral cutaneous nerve of the thigh to restore protective sensation after oncologic tumor resection. Patients living with HIV can have successful microsurgical reconstruction with optimal patient selection and preparation.

REFERENCES

1. Torre LA, Bray F, Siegel RL, Ferlay J, Lortet-Tieulent J, Jemal A. Global cancer statistics, 2012. *CA Cancer J Clin.* 2015 Mar;**65(2):**87–108.
2. Onyango JF, Awange DO, Njiru A, Macharia IM. Pattern of occurrence of head and neck cancer presenting at Kenyatta National Hospital, Nairobi. *East Afr Med J.* 2006 May;**83(5):**288–91.
3. Gathere S, 1*, , Mutuma G, 2, , Korir A, 3, et al. Head and Neck Cancers four year trend at the Nairobi Cancer Registry. *Afr J Health Sci* 2011 1930-35.
4. Herida M, Mary-Krause M, Kaphan R, Cadranel J, Poizot-Martin I, Rabaud C, et al. Incidence of non-AIDS-defining cancers before and during the highly active antiretroviral therapy era in a cohort of human immunodeficiency virus-infected patients. *J Clin Oncol Off J Am Soc Clin Oncol.* 2003 Sep 15;**21(18):**3447–53.

5. McGinnis GJ, Ning MS, Bvochora-Nsingo M, Chiyapo S, Balang D, Ralefala T, et al. Management of Head and Neck Cancers With or Without Comorbid HIV Infection in Botswana. *The Laryngoscope*. 2021 May;**131(5):**E1558–66.
6. Salahuddin S, Cohen O, Wu M, Perez Irizarry J, Vega T, Gan G, et al. Human Immunodeficiency Virus Is Associated With Poor Overall Survival Among Patients With Head and Neck Cancer. *Clin Infect Dis Off Publ Infect Dis Soc Am*. 2023 Apr 17;**76(8):**1449– 58.
7. Shiels MS, Pfeiffer RM, Gail MH, Hall HI, Li J, Chaturvedi AK, et al. Cancer burden in the HIV-infected population in the United States. *J Natl Cancer Inst*. 2011 May 4;**103(9):**753–62.
8. Deeken JF, Tjen-A-Looi A, Rudek MA, Okuliar C, Young M, Little RF, et al. The Rising Challenge of Non–AIDS-Defining Cancers in HIV-Infected Patients. *Clin Infect Dis Off Publ Infect Dis Soc Am*. 2012 Nov 1;**55(9):**1228–35.
9. Chiao EY, Coghill A, Kizub D, Fink V, Ndlovu N, Mazul A, et al. The effect of non-AIDS-defining cancers on people living with HIV. *Lancet Oncol*. 2021 Jun;**22(6):**e240–53.
10. Singh B, Balwally AN, Shaha AR, Rosenfeld RM, Har-El G, Lucente FE. Upper aerodigestive tract squamous cell carcinoma. The human immunodeficiency virus connection. *Arch Otolaryngol Head Neck Surg*. 1996 Jun;**122(6):**639–43.
11. Nangole WF, Khainga S, Aswani J, Kahoro L, Vilembwa A. Free Flaps in a Resource Constrained Environment: A Five-Year Experience – Outcomes and Lessons Learned. *Plast Surg Int*. 2015;2015:194174.
12. Song YG, Chen GZ, Song YL. The free thigh flap: a new free flap concept based on the septocutaneous artery. *Br J Plast Surg*.
13. Zaretski A, Wei FC, Lin CH, Cheng MH, Tsao CK, Wallace CG. Anterolateral Thigh Perforator Flaps in Head and Neck Reconstruction. *Semin Plast Surg*. 2006 May;**20(2):**64–72.
14. Shieh SJ, Chiu HY, Yu JC, Pan SC, Tsai ST, Shen CL. Free anterolateral thigh flap for reconstruction of head and neck defects following cancer ablation. *Plast Reconstr Surg*. 2000 Jun;**105(7):**2349–57; discussion 2358-2360.
15. Koshima I. Free Anterolateral Thigh Flap for Reconstruction of Head and Neck Defects following Cancer Ablation. *Plast Reconstr Surg*. 2000 Jun;**105(7):**2358–60.
16. Chana JS, Wei F chan. A review of the advantages of the anterolateral thigh flap in head and neck reconstruction. *Br J Plast Surg*. 2004 Oct 1;**57(7):**603–9.
17. Huang WC, Chen HC, Jain V, Kilda M, Lin YD, Cheng MH, *et al.* Reconstruction of Through-and-Through Cheek Defects Involving the Oral Commissure, Using Chimeric Flaps from the Thigh Lateral Femoral Circumflex System. *Plast Reconstr Surg*. 2002 Feb;**109(2):**433.
18. Koshima I, Yamamoto H, Hosoda M, Moriguchi T, Orita Y, Nagayama H. Free combined composite flaps using the lateral circumflex femoral system for repair of massive defects of the head and neck regions: an introduction to the chimeric flap principle. *Plast Reconstr Surg*. 1993 Sep;**92(3):**411–20.
19. Wei F chan, Jain V, Celik N, Chen H chi, Chuang DCC, Lin C hung. Have We Found an Ideal Soft-Tissue Flap? An Experience with 672 Anterolateral Thigh Flaps. *Plast Reconstr Surg*. 2002 Jun;**109(7):**2219.
20. Runodada PM, Chihaka OB, Muguti GI. Surgical outcomes in HIV positive patients following major surgery at two tertiary institutions in Harare, Zimbabwe. *Int J Surg Open*. 2020 Jan 1;**22:**12–7.
21. Brand M, Woodiwiss AJ, Michel F, Nayler S, Veller MG, Norton GR. Large vessel adventitial vasculitis characterizes patients with critical lower limb ischemia with as compared to without human immunodeficiency virus infection. *PloS One*. 2014;**9(8):**e106205.

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2. Haynes, R.B., Mulrow, C.D., Huth, E.J., Attman, D.G. and Gardner, M.J. More informative abstracts revisited. *Ann. Intern. Med.* 1990; 113:69-76.

3. Editorial. The Ingelfinger Rule revisited. *N. Engl. J. Med.* 1991; 235:1371-1373.

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