



OPERATION RESTORE FOR POST-BURN DEFORMITIES; SEVEN YEARS OVERVIEW AT NATIONAL BURNS CENTRE, INDIA

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ABSTRACT

In developing as well as developed world, burn trauma contributes the second most common cause of trauma related death. When burn injury takes longer time to heal, more likely a post-burn contracture forms. Burns need longer than 3 weeks to heal, produce hypertrophic scars, and form contractures. Hence the critical situation is the patients who do not receive care shortly after their burn, are more likely to develop contractures. Among 125 crores people living in India, 6-7 million people face the burn incident annually. After road accidents, burn remains in the second largest group of injuries. The National Burns Center (NBC) promoted by the Indian Burns Research Society, is a unique Centre in India to tackle burns holistically, starting from fresh burns to post-burn deformities. In a developing country like India, post-burn contractures severely deteriorate life and quality of burn patients. Here in this article, we aimed to review and present our free treatment process, "Operation Restore" to correct the functional deformities and help the economically challenged burns survivors to lead a near normal life who could not afford the corrective surgery.

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INTRODUCTION

Worldwide, there are 57 countries with a shortage of work force meant for critical healthcare like burns and India is one among them [1]. Post burn contractures are common in burns and significantly impact quality of life. In India, over 1 million people are moderately or severely burnt, out of these about 2 lakh succumb to injuries and as many as 5 lakh develop contractures. The incidence of post burn contracture is extremely high which makes the life of burn victims miserable. Quite often, they are not only multiple in a given patient but also very severe and diffuse. Post-burn contractures severely deteriorate the quality of life. Scar formations as a consequence of burns are inevitable even after receiving the treatment in case of deeper burns. Degree of scarring is directly proportional to the depth of the burn injury [1]. The longer it takes for a burn injury to heal, the more likely a burn contracture will form. Contractures can begin as a slight puckering of scar tissue. Over time this scar tissue becomes a thick band of a hypertrophic scar. Tight bands of scar tissue can restrict

joint movement, lead to the loss of joint mobility, and permanently impair normal joint function. Although scars can be minimized through various physical therapy measures and surgical procedures they can't be removed completely. A burn patient who receives the best of treatment is expected to heal without any contractures [2]. In 2010, for need of burn patients, operation restore at NBC started as "Operation Smile" and annually 55 to 60 surgeries were done up to 2013 and then onwards continued thrice in a year as "Operation Restore". Most burn victims come from low socio-economic group. They are from poor families residing in chawls and small houses which lack separate spaces for different activities. The survivors are left to spend the remainder of their lives suffering from burn-related physical disabilities not because they are irreparable, but because their families cannot afford the necessary medical care. Survivors often lose the ability to be productive citizens [3].

Also there is lack of awareness among these people to take primary care just after burn incidence. Treatment of burns

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in a hospital is very costly - beyond the reach of the underprivileged. Even if the victim's life is saved, disfigurement or crippling disabilities follow in most cases making their life miserable. In many patients who suffer deformities, it makes them jobless and even day-to-day living becomes difficult. Inferiority complex is developed and such patients are traumatized due to horrifying burn memories. Majority of the crippling burns cases in India are young housewives where the quality of life is affected severely. Hence there is a crying need to develop free-of-cost surgical camps in order to correct the functional deformities of economically challenged burn survivors to help them lead a near normal life.

To overcome the problem of post burn contractures in non-affordable patients, National Burns Centre (NBC) has been organizing a free-of-cost surgical camp called "operation restore". It is a free-of-cost surgical camp to correct the functional deformities and help the economically challenged burn survivors who could not afford the corrective surgery to lead a near normal life. This article reviews the historical aspects, organization, difficulties and success of Operation Restore camp since last 6 years.

History of Operation Restore

To create a protected environment for conducting a surgery for post-burn contractures, in India, National Burns Centre gave the assurance to carryout operations in free of cost. Operation Restore was first started in 2011 by Rotary club of Deonar with the help of the Operation SMILE team (USA based NGO). Initially, the SMILE team consisted of medical experts coming from different parts of the world and these camps were referred to as "Operation Smile". For first two years, three camps were successfully organized with the SMILE team at National Burns Centre (NBC). About 60 patients in each camp were treated over a period of one week. The specialist surgeons and medical experts at NBC and that of SMILE team worked together as a result of which about 180 very complex and challenging surgeries had been successfully carried out back then. Both the NBC and the SMILE team exchanged knowledge and refined their skills and techniques.

Subsequent 12 camps were organized by Rotary District 3140 with National Burn Centre (NBC) and these camps are the "Operation Restore" camps. Since 2013, twelve "Operation Restore" camps were organized at National Burns Centre and total 419 patients operated for better post-surgical treatment. Each year 3 camps are organized and the methodology for contracture release has been modified by experts. In each of these camps, about 30 patients were operated upon over a span of two days. More than 15 Rotary clubs have joined Operation Restore for providing financial assistance. After the 3rd camp (Operation Smile), the methodology was modified. In recent years, 3 camps are organized in a year instead of one camp, keeping in mind the workload at NBC and also to ascertain better post-surgical treatment and follow-up. A total of 418 patients operated in 15 Operation restore camps till 2016. Average number of patients operated each year through this camp is 50-60.

Objective

Even if the burn victim's life is saved, disfigurement or crippling disabilities follow in most cases making their life miserable. In many patients who suffer deformities, it makes them jobless and even day-to-day living becomes difficult. Inferiority complex is developed and such patients are traumatized due to horrifying burn memories. Majority of the crippling burns cases in India are young housewives where the quality of life is affected severely. Hence the need of such free surgeries. The main objective of the Operation Restore camp is to correct the functional deformities and help the economically challenged burns survivors to lead a near normal life who could not afford the corrective surgery. The other objectives of operation restore are to develop basic awareness regarding "Burns & First AIDS in Burns", providing counseling, rehabilitation and follow up.

Table 1 (Age of Patients)

Age Groups (in year)	No of cases	Percentage (%)
<10	24	11.4
11-20	28	21.8
21-30	75	34.1
31-40	54	24.5
41-50	12	5.5
Above 50	6	2.8

Table 2 (cause of Burns)

Types of Burns	Number of cases	Percentage (%)
Flame	118	85
Scald	15	11
Electrical	4	3
Chemical	1	1

Organization: (Of Operation Restore Camp)

Operation restore camp is organized at National Burns Centre hospital. NBC provides the hospital space, operation theaters, surgical instruments, operative machineries, hospital wards, surgeons, doctors, nurses, and paramedic staff. It also manages the post-operative care and rehabilitation of the patients. Preparation for the camp starts months in advance. There are weekly brain storming sessions between Rotary Club members & National Burns Centre members. All possible modes of communication are used to reach out to the prospective patients.

Awareness – As *Mary Rose McGeedy* told, there is no greater joy nor greater reward than to make a fundamental difference in someone's life. At NBC, the department of social work is an essential part of Burns Prevention & awareness and each person shows that "How wonderful it is that nobody need wait a single moment to improve the world The team of social workers plays an important role in creating awareness about free surgical camps for post-burns among general public and children in schools, colleges and communities. Rotary club members and NBC reach out to the potential patients via mass communication approaches like Digital media: FM, TV cable channel, WhatsApp, Facebook, Twitter, Gupshup SMS, etc. Print Media is also instrumental in creating awareness through Press, Pamphlets, Posters at hospitals, religious places of worship, banners at Bus stands, railway stations, Rotary Clubs, Govt. Medical colleges Plastic Surgery Depts., etc

Meetings and Assessment

Preparation for the camp starts months in advance and there happens a weekly brain storming sessions between Rotary Club members & NBC members. All possible modes of communication is used to reach out to the prospective patients. Various meetings are conducted with rotary club members, team of social workers at NBC and other members who play a crucial role in operation restore camp assessment of the potential candidates is done by a screening process which is conducted by the medical team along with the social workers at NBC. Financial status of the patients is understood along with their case history. The camp procedure is explained to the patients and their relatives. Patients having functional deformities and those who require corrective surgeries for the same are selected and are surgically treated to correct functional deformities and contractures, reducing the patients' disabilities and improving their quality of life. Complete treatment including pre-operative screening, corrective surgery, and post-operative care are provided absolutely free of cost for poor patients.

Pre-camp screening: Patients are screened at NBC based on the socio-economic status data provided by Social workers. Normal examination followed by investigation of the patients is done by a team of medical professionals. Patients are instructed regarding admission, hospitalization, Post-Op care etc.

Logistics- Medical and non-medical supporting staff are indispensable to the success of the camp. All the materials and instruments required for the camp are arranged prior to the start of the camp. Lodging and food for medical professionals is arranged for two days of the camp.

Surgery & Post-operation care - Experienced Plastic surgeons from all over India are invited to conduct the post-burn contracture release surgeries. Most of the surgeries were conducted for upper extremity release such as hand contracture release, axillary, elbow, wrist and web contracture. In restoring the functional aspects of burnt limbs and total functional rehabilitation of burn survivors to near normal level, Physiotherapy department plays an integral role. Post-operative care of the camp patients is taken by physiotherapists, nurses and RMOs of National Burns Centre. It includes regular dressing, pain management, addressing sleep related issues if any, physiotherapy (In-house or on OPD basis), Post-op Splinting, Serial Splinting, ROM exercises and stretching exercises followed by counseling of individual patients.

Team Members of the camp

The burn deformity surgeries are conducted by a specialized team of doctors including surgeons, anesthesiologists and nurses having extensive experience in the field. Plastic surgeons from all over India are invited for performing contracture release surgeries of operation restore patients. Anesthesiologists play critical role during surgery. Physiotherapy is a key component to successful contracture release and should be started soon after the operation is performed. The main goal of the physiotherapist should be to maintain the length gained by surgery Clinical psychologist and psychiatrist are required to understand the mental condition of individual patients

and cooperate in fast recovery. Nursing staffs takes utmost care of patients and help in better healing of wounds and the average numbers are represented in Table-3

Table 3 Team of Operation restores surgery camp comprised of the following personnel

Team Members	Average Number
Plastic Surgeons	7
Anaesthesiologists	7
Nursing Staff	20
Physiotherapists	4
Clinical Psychologists	1
Psychiatrist	1
Rotary and Rotaract members	25
Volunteers	10
Total	75

Types of Contracture release surgery

Patients from all over India with different types of post-burn contractures come for surgeries. Different types of surgeries are performed to release various contractures occurred as a consequence of post burn in the underprivileged patients. These include hand, axillary, neck region, web space, facial and lip ectropion. Most of the patients operated in Operation Restore camps from 2013-2015 had elbow; wrist and axillary contracture followed by hand and finger contracture (Table 3). Significant number of the patients has had severe neck contractures. Post burn neck contractures not only affect the movements of the neck, but also can affect the function of the lower face as well as result in possible tracheal alteration and distortion of the cervical spine [7]. Neck contracture and deformities as consequences of burns pose one of the greatest challenges to plastic surgeons in reconstructive surgery [3]. Hands and face are involved in most major burns. The ultimate quality of life of a survivor depends on the condition of his hands and the face [6].

Many of the women burn survivors who have been victims of acid attacks, domestic atrocities or survivors who have attempted suicide show instances of eye and lip ectropion. These contractures affect the patient significantly causing both functional limitations and esthetic disfigurements [4]. The objectives of surgical intervention are releasing the scar, restoring cervical movements, appearance and natural profile and avoiding recurrence of contracture. [7]. Despite advances in the overall management of burn injuries, post burn deformities still occur and are the most common cause of skin contractures in the hand [5]. Axillary and web space contractures of the hands and fingers respectively are also common in case of burn victims. Such deformities restrict daily activities and working abilities of patients. Popliteal contractures hamper the ability of the patients to walk and thus create hindrance to earn livelihood if the victim is a breadwinner of the family.

The release of such complicated contractures is brought about by skilled plastic surgeons. Outcomes of the surgeries have been satisfactory with maximum patients regaining the normal or near normal functioning of the deformed parts (Fig-9, Fig-10 and Fig-11). It is a boon for the poor patients who are unable to bear the cost of surgery. Thus aim with which Operation Restore Camp

was started is getting fulfilled making these patients capable of earning their daily bread over last 6 years.

Table 4 Type of surgeries done in Operation Restore camps from 2013-2016

Types of Contracture	Number of patients
Hand / Finger	145
Axillary	50
Leg	11
Neck	79
Facial	19
Total	293

Role of Rotary

Rotary club member’s help in reaching out to the prospective patients. Rotary bring patients to the surgery camp and they encourage patients with ethical standards, advance goodwill and provide peace around the camp. Rotary help in getting patients and they help in logistic of patients. Rotary sponsors the cost of surgery and helps in awareness programs. They also sponsor the costs of the surgeries including consumables and medicine charges. Psychological / mental support to the patients and families is provided by Rotary club members. They play an instrumental role in rehabilitation of the patients (Granting wishes to help in earning a livelihood). Different rotary clubs have joined hands and come forward to actively participate to make the camps a huge success. Rotary is merrily acknowledged as “Service above self” and Rotary members are like blessing bags for burns.

Management of Burn deformities

There is very high risk of development of deformities, when primary management of burn is compromised. The deformities ranges from Post burn unsightly, hypopigmented, hyper-pigmented and hypertrophic scars to post burn contractures in face, hand, feet, neck etc. Hand deformities are the most common and thereafter face & neck. Once the deformities develop, they need to be managed timely and appropriately. The factors that are considered for management of the deformities include, age, sex, occupation, area of deformity, duration since wound healing etc. decide the time and type of surgical management. Most of these deformities are disabling for the patient as well as matter of great concern for all the family members. Hence these should be managed on priority basis and when it is fit for surgical intervention.

Difficulties and challenges

One of the most important and difficult aspects of Operation Restore is to create awareness among people for free camp for post burn contracture release. A team of social workers from NBC goes to various government hospitals, public places, slums where posters are displayed stating the date of the camp and the time for pre-screening of the patients. Patients coming from rural areas of different states are unable to communicate as they know only their local language. In that condition it is inconvenient for the clinical psychologists and the doctors to converse with them. At times it is difficult to convince the patients that surgery is indeed free and no money will be taken from them before or after surgery. During pre-screening session, if any patient is found medically unfit

for the surgery then it becomes rather difficult to make them understand. The plastic surgeons, anesthesiologists and other staffs involved in the surgeries have to be informed well in advance to ensure their availability. Since most of the patients are from low socio-economic background and uneducated, it is quite difficult to impress upon them the need for regular follow up.

DISCUSSION

In 1986, Dr. MH Keswani said “The challenge of burns in India lies not in the successful treatment of a 100% burn, but in the 100% prevention of all injuries”[9]. As it is not possible yet to gain control over 100% prevention, contractures and hypertrophic scars result in post-burn patients become life suffering. Within six year of time span, a total of 419 patients were managed for treatment in 15 operation camps at NBC from year 2011 to till date and the average patients per year is about 50 to 60 (figure-1). The youngest patient was a baby girl of one and half year old and the oldest patient was 70 year female. Females accounted 66% of patients in our study (shown in Table-1 and Figure 2). Similar observation reported by several studies, where females are almost 60-70 % of total patients (ref-3m, 4m). Majority of the patients are within age group 21-30 as shown in figure-3. In our patients, the highest number of flame burns cases were 118 numbers and the second highest is of scald burns as shown if figure 4A. The pattern of female to male ratios was same in flame burn cases (figure 4B). Very lower numbers of chemical and electric burn patients were in operative restore camp. In some cases patients developed the contracture within a year after post-burn scar and in most cases it takes more than two years (shown in figure-5)

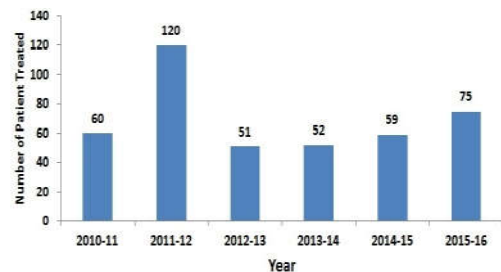


Figure 1- Number of Operation Restore patients per year

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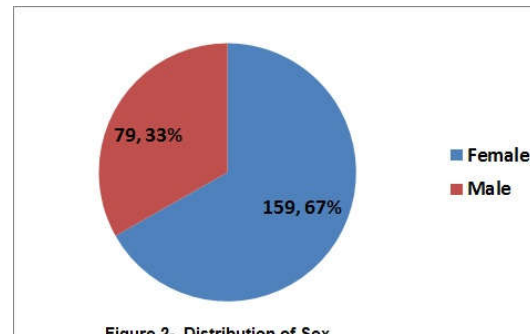


Figure 2- Distribution of Sex

Figure 2 Number of patients (Sex wise)

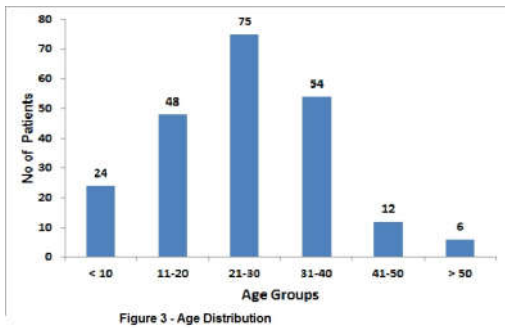


Figure 3 Number of patients in different age group

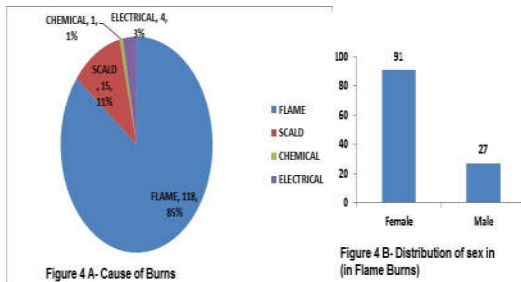


Figure 4 Cause of Burns

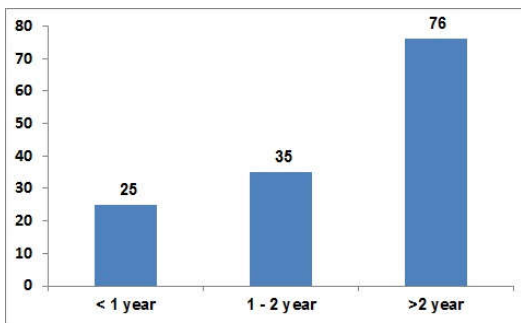


Figure 5 Interval between burns and Contracture

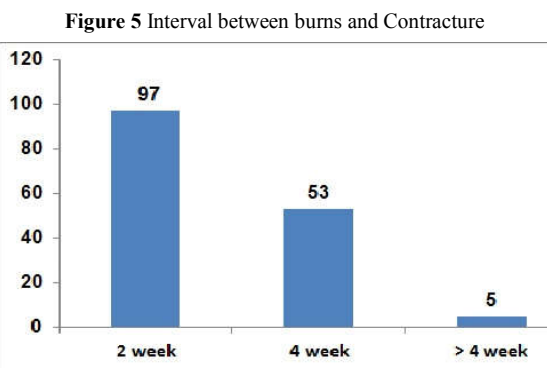


Figure 6 Post Operation hospital stay

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Extensive contracture requires the release of scar tissue and skin grafting is a reliable and safety operation. During the contracture resurfacing, most of the patients were given the practical method of resurfacing and STSG grafts used in 95% of our camp patients (shown in figure-6)[10]. The post-operative care was equally important and the patients stayed at hospital for the period of 2 weeks to months (Figure-7).

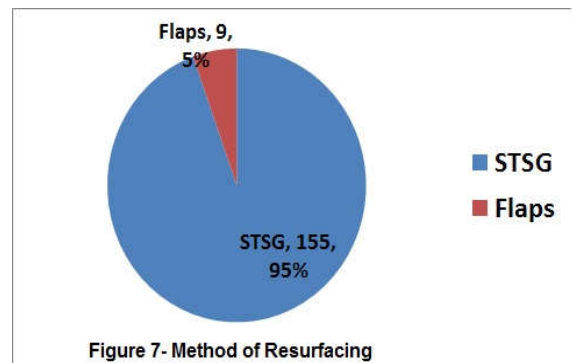


Figure 7 Method of Resurfacing

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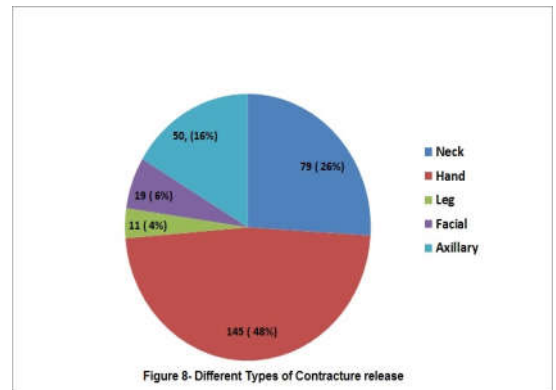


Figure 8 Types of contracture release Surgeries



Fig-9 A & B - Neck Contracture release



Fig-9 C-Contracture release surgery performed for Neck Contracture

Figure 9 Contracture release surgery pre-operation and post-operation (A and B) Neck Contracture. (C) Lower Lip contracture release



Fig-10-A&B-Right elbow and axillary Contracture release

Figure 10 Contracture release surgery of right elbow and axillary contracture pre-operation and post-operation (A & B)

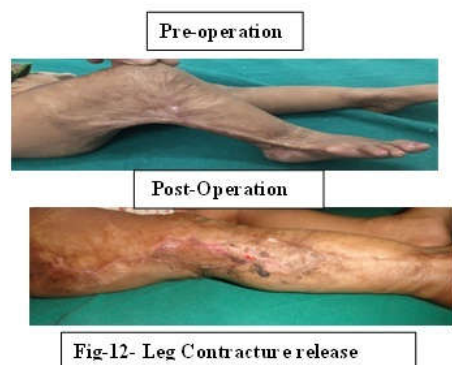


Figure 12 Leg contracture release surgery (pre-operation and post-operation)

In our cases total of 145 patients operated for hand contracture release and the 79 patients are for neck contracture release (figure-8). The leg and face contracture patients were also successfully operated for their movement of respective body parts. It would have been impossible to carry out this endeavor without the continued and holistic support from the Rotary club members, the technical and non technical staff of NBC and the surgeons. Hundreds of burn survivors have benefitted from this camp and are on their way towards a happy and productive life.

CONCLUSION

“Operation Restore” at NBC is able to correct the functional deformities and help the economically challenged burn survivors to lead a near normal life. Also it could provide the corrective surgery to many post-burn contracture patients who become fit to live in society in a normal way. The holistic support of the surgeons, the rotary club members, the technical & non-technical staffs of NBC make this operation restore successful in the country.

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