

Original Research Article

SPARSH: a camp based approach for orthopaedic disabilities and its success in central India

Prakhar Singhal¹, Santosh Kumar Mishra^{2*}, Jiten Shukla², Rahul Verma², Ashish Gohiya²

¹Department of Orthopaedics, RKDF Medical College, Bhopal, M.P., India

²Department of Orthopaedics, Gandhi Medical College, Bhopal, M.P., India

Received: 10 May 2020

Revised: 05 July 2020

Accepted: 10 July 2020

*Correspondence:

Dr. Santosh Kumar Mishra,

E-mail: doctorskmishra@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Around 15% of population in the world is living with disability. The present study was carried out during the special project for assistance, rehabilitation and strengthening of handicapped (SPARSH) camp to know the current pattern of locomotor disability and to observe the outcome of the camp surgeries for the correction of deformity.

Methods: This prospective observational cross-sectional study was conducted at the department of orthopaedics and traumatology Gandhi Medical College at SPARSH camp organised by the Government of M. P. at J. K. hospital Bhopal. All the patients with locomotor disability attending the SPARSH camp irrespective of age, sex and cause, were included in the study

Results: In total 287 patients attended the camp in which majority of the patients were suffering from cerebral palsy. 107 patients were selected for operative intervention in which tendo-achilles lengthening was performed most commonly.

Conclusions: The corrective surgical camp provides an avenue of healthcare opportunity for the underprivileged sector of society. A camp based approach helps in identification, gradation & rehabilitation of orthopaedic deformities.

Keywords: SPARSH, Disability, Camp based approach

INTRODUCTION

Around 15 percent of population in the world is living with disability and 2.2 percent people have very significant difficulties in functioning according to world health survey¹. According to the census of India 2011 data 26,810,557 people are disabled and out of which around 20 percent are suffering from some kind of locomotor disability². Around 10% of the population in our country is disabled, and cerebral palsy alone is the cause amongst 30 percent of the disability³. Congenital talipes equinovarus deformity is considered as

most common congenital disability of the foot in our country India.⁴

In 2014, India celebrated three years without reporting any case of Polio. Yet, an estimated 20 million people continue to live with post-polio sequelae worldwide⁵.

The project was initiated to facilitate proactive and effective implementation of various provisions as per the spirit of the 'Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995. The SPARSH camp has become

an example of achievement of Public Private Partnership (PPP) model of rehabilitating orthopaedic disabilities.

The present study was carried out during the 'SPARSH' camp to know the current pattern of locomotor disability among the patients attending the camp and to observe the outcome of the camp surgery for the correction of deformity.

METHODS

This study was conducted at the department of orthopaedics and traumatology Gandhi Medical College at SPARSH Camp organised by the Government of M.P at J.K. Hospital, Bhopal. It was a prospective observational cross sectional study of the patients with locomotor disability attending the SPARSH Camp.

All the patients with locomotor disability attending the SPARSH Camp irrespective of age, sex and cause, were included in the study. A detailed history, clinical examination, blood test and X-ray if required were done in all registered cases. SPARSH camp was organized at tertiary health centre in Bhopal where patients were screened and selected from eight districts of Madhya Pradesh and Nabadapuram in cooperation with Department of Social Justice Government of MP from 3rd to 10th December 2013. This camp was conducted in 3 phases. In Phase -I of the camp all the patients who attended the camp were examined by the specialist doctors, if required relevant investigations were also carried out to come to a diagnosis, treatment options discussed by the team of doctors. Those patients who were planned for surgical intervention were admitted.

Operative criteria

The main criteria with any operation on the lower limb were whether the patient will be socially benefitted by being able to walk with or without calliper. In adult patients operative procedures were only indicated when there was good chance of reasonable mobility achieved after surgery.

The cerebral palsy patients were selected for surgical intervention with following criteria:

Patients with mild to moderate illness, standing or walking with or without support and patient with lower limb affection⁶ and patients having power of at least 3/5 in the opposing muscle of the affected limb⁷.

The PPRP (post-polio residual paralysis) patients were selected for surgical intervention as per the following criteria:

Child with one or both legs affected but has good trunk muscles and at least 4/5 power in upper limb muscles⁷ and young adults with one or few moderate deformities of the foot or the knee⁸.

The CTEV patients to be operated were included as per the following criteria:

Moderate to severely deformed rigid CTEV and neglected CTEV standing or walking with some or other gaits, with or without support⁹.

In Genu valgus, patients with 15-20° of valgus in <10 years of age and if line drawn from centre of femoral head to centre of ankle falls in lateral quadrant of tibial plateau in patient >10 years of age¹⁰ were included. In case of radial club hand, children who have radial club hands of Heikel's Grade III and IV¹¹ were included and in case of torticollis Only patients with idiopathic congenital muscular torticollis¹² were included.

Patients with spinal deformities/disease, patients who needed multiple surgery or a complex surgery, minimal deformities not requiring surgeries, patients with weak opposing muscles were not operated at the camp.

Those patients selected for surgery were operated under general anaesthesia in Phase-II of the camp. Both soft tissue and bony procedures were performed, followed by Plaster of Paris (POP) casts applied with or without traction to maintain the correction. Stitches were removed after 12 days. Traction and POP was continued if required. Patients were discharged 7 days postoperatively and were called for follow up after six weeks of the date of surgery in the Phase 3 of the camp. POP was removed after 6 weeks of surgery. Appropriate physiotherapy was advised in each case. Correction of deformity was reassessed. Trial of fitting of callipers was done. Standing alignment was checked and gait training in parallel bar started. Each patient was trained for the use of calliper and maintenance of calliper, motivated to perform physiotherapy regularly every day. Counselling of the parents, guardians or care providers was also undertaken. Further the patient was asked to follow up at Hamidia Hospital Bhopal at one monthly interval up to 6 months then on 3 monthly bases up to 2 years.

Soft tissue release was aimed at correcting soft tissue contractures. It involved division of the shortened structures such as fascia (fasciotomy), fibrotic muscle (myotomy) or their tendons (tenotomy) and articular capsules (capsulotomy). The tendons were also transferred, eliminating the deforming action and providing a new useful function. Procedure to correct bony deformity like osteotomy and arthrodesis was done.

For tendon lengthening the most commonly used technique was Z-Plasty and fractional lengthening. Fractional lengthening of the tendon (Tachdjian technique) was used for lengthening of ilio- psoas or hamstring muscles. Tendon Transfer were undertaken to eliminate the deforming action of a muscle or to place a tendon in a position where it can perform a new corrective function. All deformities were first corrected before tendon transfers were undertaken. Any muscle to be

transferred was first assessed to have good power or be normal (grade 4 or 5)⁷.

Gradation of result

Due to various aetiology of diseases treated in the SPARSH Camp a single criteria cannot be taken to assess the outcome, so a broad criteria was deduced by the group of senior doctors involved in the camp to grade the result of deformity corrective surgery as good, fair or poor.

Grade good was given in cases of complete correction of deformity clinically, if orthosis can be fitted properly to the patient and gross improvement in the gait of the patient. Grade fair was given in cases of presence of slight residual deformity which is orthosis compatible and

improvement of the gait. Grade poor was given in cases of deformity still present which are incompatible with the orthosis and no improvement in gait.

RESULTS

In total 287 patients attended the camp out of which 64.2% were male and 35.8% were female. Maximum number of patients i.e. 35.5% were from the age group 6-10 years of age (Table 1). Majority of the patients of SPARSH camp had lower limb deformity i.e. 55.4 %, whereas 25.1% patients had upper limb deformity. All the four limbs were involved in 3.2% cases while spine was affected in 16.3% cases. As shown in table no. 2 majority of the patients were suffering from cerebral palsy (19.16%) followed by CTEV (12.89%) and PPRP (8.01%).

Table 1: Distribution of disease according to age.

Disease	Age (years)						Total
	1-5	6-10	11-15	16-20	21-25	>25	
Cerebral palsy	11	20	14	6	4	0	55
CTEV	8	12	8	7		2	37
Achondroplasia		1	3	1			5
Ankylosing spondylitis		1	2	1			4
Cervical injury			1				1
Cervical tumour		1					1
Cubits varus		5	1	1			7
Cong. dislocation of hip	2	1					3
Cong. vertical talus	1	1					2
Hereditary multiple exostoses		1	1	1			3
Genu valgus	1	4	4	3			12
Genu varus	3						3
Kyphosis		2	1	1			4
Leprosy	1	1	1		1		4
Lordosis			1	2			3
Muscular dystrophy	5	1					6
Meningomyelocele	1	4					5
Osteomyelitis		1	2	3		1	7
Osteonecrosis / perthes		6	1	1			8
PPRP	1	5	9	5	2	1	23
Pseudo arthrosis		3					3
Radial club hand	3	2	2		1		8
Radial head dislocation	1		1				2
Slipped capital femoral epiphysis (SCFE)			2				2
Acquired contracture			2				2
Cong. humerus shortening	1	1					2
Madelung's deformity		2	2	1			5
Syndactyly and polydactyly		7	2	3	6	2	20
Scoliosis	2	8	1	1			12
Torticollis		1	3	1	2		7
TB of spine		2	3	2			7
VIC (Volkmann ischemic contracture)	1		3	1	1		6
Total	44	102	73	42	19	7	287

Table 2: Diagnosis of all 287 patients and the patients selected for surgery.

Disease	Patients presented	Percentage (%)	Patients selected for surgery
Achondroplasia	5	1.74	-
Ankylosing spondylitis	4	1.39	-
CTEV	37	12.89	24
Cerebral palsy	55	19.16	40
Cervical injury	1	0.35	
Cervical tumour	1	0.35	
Cubits Varus	7	2.44	2
Congenital dislocation of hip	3	1.04	
Congenital vertical talus	2	0.70	
Hereditary multiple exostoses	3	1.04	1
Genu valgus	12	4.18	6
Genu varus	3	1.04	-
Kyphosis	4	1.39	
Leprosy	4	1.39	-
Lordosis	3	1.04	-
Muscular dystrophy	6	2.09	-
Meningomyelocele	5	1.74	
Osteomyelitis	7	2.44	-
Osteonecrosis / perthes	8	2.79	-
Post burn contracture	14	4.88	9
PPRP	23	8.01	14
Pseudo arthrosis	3	1.04	1
Radial club hand	8	2.79	2
Radial head dislocation	2	0.70	1
SCFE	2	0.70	
Acquired contracture	2	0.70	1
Congenital humerus shortening	2	0.70	
Madelung's	5	1.74	
Stiff joints (arthritis)	4	1.39	-
Syndactyly and polydactyly	20	6.97	4
Scoliosis	12	4.18	-
Torticollis	7	2.44	2
TB of spine	7	2.44	
VIC	6	2.09	
Total	287		107

Table 3: Type of surgical intervention performed.

Procedure performed	No. of surgeries	Percentage (%)
Hamstring release	27	13.64
Adductor release	24	12.12
V-Y Quadriceps plasty with ITB release	3	1.52
Iliopsoas release	4	2.02
Gastrocnemius lengthening	8	4.04
TA lengthening	28	14.14
PMSTR	22	11.11
Triple arthrodesis	21	10.61
Osteotomy	18	9.09
Centralisation of ulna	2	1.01
Epiphysiodesis	8	4.04
Bipolar release	4	2.02
Contracture release	20	10.10
Musculocutaneous flap cover	9	4.44
Total procedures	198	100

Total 37.28% (107) patients were operated during the camp and 198 procedures were performed. But 62.72 % could not be rehabilitated by surgery. Among which 149 soft tissue surgery and 49 bony procedure was performed. Most common procedure performed was Tendo-achilles lengthening followed by hamstring release adductor release, PMSTR (posteromedial soft tissue release) and triple arthrodesis (Table 3).

Among operated patients 9 cases had post-operative complication at the time of discharge from the hospital with 5 cases of superficial infection and 4 cases of deep infection. Among total operated patients 26 (24.3%) patients were lost in follow up. We had achieved good to fair outcome in 95.1% cases.

DISCUSSION

In our study we have observed that 64.2% of the disabled attending the camp consisted of the male population. Office of the Registrar General & Census Commissioner, India (Census 2011)² reported that “62 % of the locomotor disabled population consisted of the male population”. Benn et al. observed male population consisted 60% of the population which attended the camp⁶. In our study, we made an observation that maximum patient who attended the camp were in the age group of 6-10 years. Most of the patients of cerebral palsy and CTEV belong to age group of 6-10 years, whereas maximum patient of PPRP belongs to the age group 11-15 years. The early age intervention of the patient is beneficial as physiotherapeutic and orthotic measures used as per the requirement needed to prevent worsening of the deformity and prevent patient from major surgical procedure. In the study by Khare et al. maximum cases were between 6-15 years age group¹³. Benn et al. at a free CTEV corrective surgical camp observed that all of the CTEV patients were in the age group of 4-16 years of age¹⁴.

In current study majority of cases suffered from cerebral palsy (19.16%) followed by CTEV (12.89%) and PPRP (8.01%). Deshmukh Gajanan and Raza HTK in their study of experience at an orthopaedic camp observed 31% (maximum) of the patients were suffering from cerebral palsy, 13% were CTEV cases and PPRP cases made up 22%¹⁵.

In our study we have made an observation that lower limb deformity predominated. We also made an observation that in CTEV 73% cases were suffering from unilateral limb deformity whereas rest 27% cases had bilateral deformity. Whereas in cerebral palsy patients 54% had bilateral limb deformity also in the case of PPRP 78% patients had bilateral limb deformity. In the study by Kar N paralysis affects mainly lower limb (53.3%) followed by one upper limb (15.6%) , he also observed that 11% of the cases of poliomyelitis had bilateral deformity¹⁶. Benn et al. studied corrective surgery in congenital talipes equinovarus deformity done

in a camp where they observed that 70% CTEV cases were unilateral and 30% were bilateral foot¹⁴.

In our study soft tissue surgeries (75.2%) out-numbered bony deformity corrections. Most commonly performed procedure was TA lengthening (14.14%), followed by Hamstring release (13.64%) and adductor release (12.12%). Only 2 patients underwent centralization of ulna. In our study single stage multi-level orthopaedic surgeries were performed and found to be beneficial in Indian setup. Gupta et al. in their study concluded that in developing countries like India, where the patients would not turn up for multistage surgery and follow-up, single event multi-level orthopaedic surgeries is a cost-effective and logical approach¹⁷. Benn et al. in their study concluded that one time multilevel soft tissue with bony corrective surgeries, in patients of spastic cerebral palsy with lower limb deformities and contractures of joints, results were better for locomotion of patients⁶. Khare et al. did a study on polio rehabilitative surgery camp and concluded that bony operations should avoided in the polio corrective camp surgeries¹³.

In our study out of the 107 patients operated, 9 had post-operative complications, 5 of them had superficial infection and 4 had deep infection. Benn et al. in their study of CTEV patients at a camp, operated 50 cases out of which 7 had post-operative superficial infection which was treated by antibiotic¹⁴. Benn et al. in their study of cerebral palsy patients at a camp, operated 30 cases out of which 3 had post-operative superficial infection which was treated by antibiotic⁶.

In our study 24.3 % patients were lost in follow up after 6 weeks. 4.9% patients had poor result whereas 56.8% had good result and 38.3% had fair result. Patients and their parents were satisfied with the results of surgery and were happy that their children will eventually become functionally independent within few weeks or months with or without assistive devices. Khare et al. in their study at polio rehabilitative camp had lost 13% cases to follow up¹³. Benn et al. lost 30% of the CTEV cases to follow up, and had excellent result in 85% of the cases, good in 10% and fair in 5% of the cases¹⁴. Benn et al. lost 10% of the cerebral palsy cases to follow up, and had excellent result in 70% of the cases, good in 20% and fair in 10% of the cases⁶.

CONCLUSION

The SPARSH camp was successfully organised which clearly outlined the pattern of locomotor disability prevailing in the population. The corrective surgical camp provide an avenue of healthcare opportunity for the underprivileged sector of society. This approach helps in identification, gradation & rehabilitation of orthopaedic deformities. These are often neglected due to lack of health professionals having expertise in rehabilitating them. Hence it's an opportunity to disabled to get appropriate treatment. Limitations of the study were a

large number of patients were lost to follow up mainly due to lack of awareness regarding importance of follow-up. Thus it is recommended that an awareness programme be devised and implemented regarding the same. Also multi-stage surgical intervention cannot be performed due to lack of resources in camp based approach.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. World Health Organization .World report on disability. WHO 2011. Available at: http://whqlibdoc.who.int/publications/2011/9789240685215_eng.pdf. Accessed on 1 March 2020.
2. Census of India 2011. data on disability. Office of the Registrar General & Census Commissioner. New Delhi. 2013. Available at: <https://unstats.un.org/unsd/demographic-social/meetings/2016/bangkok--disability-measurement-and-statistics/Session-6/India.pdf>. Accessed on 1 March 2020.
3. Disability statistics: facts & statistics on disabilities and disability issues. Available at: www.disabled-world.com. Accessed on 1 March 2020.
4. Anand A, Sala DA. Clubfoot: etiology and treatment. Indian J Orthop. 2008;42(1):22-8.
5. Baliga S, Mcmillan T, Sutherland A, Sharan D. The Prevalence and Severity of Joint Problems and Disability in Patients with Poliomyelitis in Urban India. Open Orthop J. 2015;9:204-9.
6. Benn AR., Bajpai KS, Deshkar AM, Singh BP, Singh A, Vibha D, et al. Multilevel soft tissue with bony corrective surgery in lower limb deformities as one sitting procedure in spastic cerebral palsy: An experience from free disabled surgical camps. Journal of Evolution of Medical and Dental Sciences. 2015;4(49):8454-60.
7. Mauck BM. Campbell's Operative Orthopaedics. 13th ed. Philadelphia, Elsevier; 2017: 3597.
8. Hugh G. Watts orthopedic techniques in the management of the residua of paralytic poliomyelitis. Techniques in Orthopaedics. 2005;20(2): 179-89.
9. Dobbs MB, Gurnett CA. Update on clubfoot: etiology and treatment. Clin Orthop Relat Res. 2009;467(5):1146-53.
10. Singh AP Genu Valgum Causes, Evaluation and Treatment. Available at: <https://boneandspine.com/genu-valgum/>. Accessed on 5 July 2020.
11. Saini N, Patni P, Gupta S, Chaudhary L, Sharma V. Management of radial clubhand with gradual distraction followed by centralization. Indian J Orthop. 2009;43(3):292-300.
12. Nilesh K, Mukherji S. Congenital muscular torticollis. Ann Maxillofac Surg. 2013;3(2):198-200.
13. Khare R, Agarwal AK, Kumar R. Polio Rehabilitative Surgery Camps. IJPMR. 2007;1: 21-3.
14. Benn AR., Verma R, Deshkar AA, Verma V, Bajpai KS, Deshkar AM. Corrective surgery in congenital talipes equinovarus deformity: a camp approach. Journal of Evidence based Medicine and Healthcare. 2015;2(39):6412-7.
15. Deshmukh G, Raza HTK. Experiences of orthopaedic cAMP in a mobile surgical unit (life line express) in central part of India. Malays Orthop J. 2013;7(3):36-41.
16. Kar N. Pattern and Causes of Rural Based Locomotor Disabled. IJPMR. 2002;24-7.
17. Gupta A, Srivastava A, Taly AB, Murali T. Single-stage multilevel soft-tissue surgery in the lower limbs with spastic cerebral palsy: Experience from a rehabilitation unit. Indian J Orthop. 2008;42(4):448-53.

Cite this article as: Singhal P, Mishra SK, Shukla J, Verma R, Gohiya A. SPARSH : a camp based approach for orthopaedic disabilities and its success in central India. Int J Res Orthop 2020;6:975-80.