Study of Disabled Treated at Artificial Limb Centre

Brig G Singh (Retd)*, Col AK Pithawa⁺, Maj Gen G Ravindranath, VSM[#]

Abstract

Background: Artificial Limb Centre (ALC), Pune provides comprehensive rehabilitation care to disabled soldiers of Armed Forces. A retrospective study of 16308 Armed Forces personnel treated at ALC, Pune was carried out to analyse the factors resulting in disability and their distribution among the soldiers.

Methods: Records of disabled soldiers treated at ALC, Pune from 14 May 1944 to 31 Dec 2003 were analysed with respect to their age, rank structure, nature of disability, causation and body part involved to find out various factors contributing to disablement and its distribution amongst the soldiers.

Result: Trauma was the commonest cause of disability in Armed forces personnel and mine blast injury was the most frequent mode of trauma followed by road traffic accident. Study also revealed that lower limb amputation is the most common type of disability and below knee amputation is the most common level of amputation. Maximum disabled personnel were in the age group of 21 to 40 years and other ranks accounted for 92.58 % of the total number.

Conclusion: War related injuries were the most common cause of disability in the Armed Forces personnel, which affect the young soldiers in their most productive period of life.

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Key Words : Rehabilitation; Disabled soldiers; Prosthesis

Introduction

Disability as an outcome of trauma or disease process is a well-known entity. In recent years, the factors contributing to an increase in the disabled population are road traffic accidents, rapid industrialisation with inadequate safety measures, terrorist related violence and war injuries. Congenital birth defects and disabilities associated with certain chronic diseases have also contributed significantly to these numbers. Natural calamities e.g. earthquakes also add a good number to the already existing disabled population.

War related injuries are a major cause of disablement in Armed Forces personnel, which affect the young persons in most productive period of their life. Provision of suitable artificial limbs (Prostheses) and surgical appliances (Orthoses) is the most effective step in returning the patient to a normal and productive place in society [1]. The rehabilitation of the disabled person requires a skilled team of professionals to provide optimum rehabilitation care [2]. Artificial Limb Centre, Pune is contributing in comprehensive medical care of physically challenged personnel of Armed Forces for the last sixty years by providing them physical, psychological, social and economic rehabilitation.

A retrospective study of Armed Forces disabled personnel treated at this centre was carried out, to analyse common causes of disability and its distribution in different groups of Armed Forces personnel, so as to minimize incidence and extent of disability amongst soldiers and to provide data for policy planners.

Material and Methods

Artificial Limb Centre (ALC) Pune was established on 19 May 1944, with the basic aim to provide rehabilitation care to disabled soldiers of Second World War. Later on, the facility was extended to civilians in 1951. Over a period of 60 years approximately 47,000 physically disabled persons were treated in the centre. Of this, more than 20,000 were Armed Forces personnel and their dependents, while the rest were civilian patients (Tables 1,2).

Once registered, a detailed file of the patient is prepared. He is allotted a registration number and his file maintained for life. These physically challenged personnel are provided

Table 1

Total number of cases treated (as on 31 Dec 2003)

Entitled	20677
Personnel	16308
Families	4369
Civilians	26570
Total	47247

*Former Commandant ALC, Pune. [#]Senior Advisor (Surgery & Prosthetic Surgery), 166 MH C/O 56 APO. ⁺Dean & Dy Comdt, AFMC, Pune.

Table 2**Number of disabled treated**

Year	Armed Forces personnel	Civilian
1944-1953	1580	357
1954-1963	1478	3514
1964-1973	3728	3741
1974-1983	2204	4615
1984-1993	3337	8640
1994-2003	3981	5703
Total	16308	26570

Table 3**Cause of disability in armed forces personnel**

Cause	Number of patients	Percentage
Trauma	15301	93.83
- Mine blast injury	6386	41.74
- Gun shot wound	1421	9.29
- Splinter injury	893	5.84
- Road traffic accidents	3335	21.79
- Railway accident	1037	6.78
- Cold injury	1338	8.74
- Others	891	5.82
Disease	1007	6.17
- Thromboangitis obliterans	630	62.56
- Diabetes mellitus	113	11.23
- Malignancy	97	9.63
- Atherosclerosis	23	2.28
- Others	144	14.30

rehabilitation care by a team consisting of prosthetic surgeon, biomechanical engineer, prosthetist, orthotist, physiotherapist, gait training instructor, occupational therapist, medico-social worker, psychiatrist and psychologist. Every case is seen by this team at the start of the treatment and followed through at various stages till final discharge. The modalities and line of treatment is discussed and implemented by the rehabilitation team, to achieve its aim of restoration of a disabled to his optimal physical, mental and social status. An all out effort is made to achieve this aim, as clientele satisfaction is intimately linked to rehabilitation programme and is of growing concern to hospitals [3].

In the past disabled Armed Forces personnel used to be provided with exoskeletal prosthesis and conventional rehabilitation aids, made from wood, leather and plastic. Now they are provided with state of art, modern endoskeletal prosthesis and orthosis made up of metals, carbon fibre composite and fibre reinforced plastics. The new prostheses and orthoses are lightweight, strong and sturdy which provide high degree of physical efficiency. They are more durable than conventional prosthesis and orthosis [4].

Results and Discussion

This study has revealed that war and counter insurgency operation related injuries are the major cause of disability in Armed Forces personnel. War wounds occur in conventional war, counter insurgency operations

Table 4**Nature of disability**

Disability	Number of Patients	Percentage
Amputation	11050	67.76
- Lower limb	9829	88.95
- Upper limb	1117	10.11
- Both	104	00.94
Deformities	5258	32.24
- Lower limb	4677	88.95
- Upper limb	532	10.12
- Both	49	00.93

and terrorist related violence. The steady improvement in the mortality and morbidity in the major wars of the 20th century has been based on sound principles of Military Medicine [5].

Globally, the major factors that cause disability are non-communicable and mental conditions (36%), communicable diseases (23%), congenital or birth disturbances (18%), trauma and injuries (17%) and other conditions (6%) [6].

However, this study shows that trauma, whether due to war or accident is the most common cause of disability amongst Armed Forces personnel. Trauma accounts for 93.83 % of cases of disability. This may be due to the younger age profile of the soldiers, who are less prone to disabling diseases (Table 3).

Among causes of trauma, mine blast injuries (41.74%) constitute the largest number of cases. Gun shot wounds and splinter injuries are other important causes of war related injuries. Road traffic accident (21.79%) is the second most common cause of disability. Railway accidents (6.78%) also contribute significant number of cases. This could be due to frequent movements of troops due to exigencies of services and leave travel. Cold injuries (8.74 %) also accounted for a significant number of cases, due to deployment of troops at high altitude and snow bound area.

Thromboangitis obliterans (62.56%) is the most common disease, which resulted in permanent disability in soldiers. Other diseases included malignancy (9.63%), nerve palsy, neurological disorders, diabetic gangrene (11.23%) and atherosclerosis.

As far as nature of disability is concerned amputation (67.76%) constitutes the greatest number of cases of disablement (Table 4). Upper limbs amputation accounts for 10.11% of cases, while lower limb amputation constituted 88.95% of total amputations. This predominance is due to the fact that mine blast injuries, frost bite and peripheral vascular diseases usually involve lower limbs.

In lower limb amputation below Knee amputation (67.78%) is the most common level of amputation

followed by Above Knee amputation (18.84%), Partial foot amputation (9.07%), Symes amputation (3.15%) and other amputation (1.16%). Below Knee amputation was the commonest amputation level in lower limb in various studies including surveys conducted by United State Department of Health and Human Services [6,7]. Bilateral amputation accounted for 16.78%.

Among upper limb amputees, Below Elbow (38.36%) was the commonest level of amputation followed by Above Elbow (35.02%) and Partial hand amputation (13.64%) and other amputations (12.98%). Right upper extremity is more commonly involved (66.72%) than left, due to dominant use of the right extremity.

In addition to amputation, deformities of limbs and spine resulting from neurological disorders, non-union and malunion of fractures account for other cases who were provided with surgical appliances. Here again lower limb deformities (88.95%) outnumbered deformities involving upper limb (10.11%), while 0.94% had involvement of both extremities.

As far as distribution of patients among the three wings of Armed Forces is concerned, it is seen that Army (97.29%) contributes largest number of disabled patients followed by Air Force (2.15%) and Navy (0.56%). The reason for this uneven distribution is due to proportional strength of the three services. Moreover, Army Personnel are exposed more to risk of injury both during war and peace, while air-crash and naval ship disasters are rare and more likely to end in fatality than injury.

Maximum numbers of disabled patients are in the age group of 18 to 30 years (77.38%) followed by age group 31-40 years (14.57%), 41-50 years (7.65%) and Above 50 years (0.40%). This is due to the fact that these age groups form the bulk of Armed Forces and are prone to injury during war and peace.

Distribution analysis of disabilities among patients showed that Other Ranks (ORs) constituted major chunk (96.12%) of disabled population followed by officers (3.94%) and then junior commissioned officers (3.48%). The reason for this uneven distribution is due to proportional strength of these subgroups. Secondly the duties of officers and JCO's are usually supervisory in nature, thus reducing their risk of injury.

To conclude trauma is the most common cause of disability in Armed Forces personnel and mine blast injury is the most frequent mode of trauma, followed by road traffic accident. With the use of mine protective appliances e.g. Anti-Mine Boots and effective traffic

regulations, incidence of trauma and resultant disability can be reduced in Armed Forces personnel. Lower limb amputation is the most common type of disability and below knee amputation is the most common level of amputation found in the study. Among the three wings of Armed Forces, Army contributes the greatest number of disabled patients. Maximum disabled personnel are in the age group of 21 to 40 years and ORs account for 92.58 % of the total number. Findings of our study are comparable to the study carried out in 1986 by Soni et al [10].

Conflicts of Interest

None identified

Intellectual Contribution of Authors

Study Concept : Brig G Singh (Retd),

Maj Gen G Ravindranath, VSM

Drafting & Manuscript Revision : Col AK Pithawa

Statistical Analysis : Col AK Pithawa,

Maj Gen G Ravindranath, VSM

Study Supervision : Brig G Singh (Retd),

Maj Gen G Ravindranath, VSM

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