A Preliminary Report on the Amputee Census

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What is the magnitude of the amputee population of the United States? What is the composition of this group of physically handicapped individuals in terms of their sex, ages, and sites of amputation? What proportion of amputations is caused by disease? By trauma? By tumor? The answers to these questions are today more a matter of opinion than of documented fact since statistics relating to amputees that are based on large numbers of cases collected from all states of the Union have never heretofore been available.

In the interest of developing certain basic descriptive data concerning the amputee population of the United States, the Amputee Census was initiated in October 1961 as a joint project of the Committee on Prosthetics Education and Information and the American Orthotics and Prosthetics Association. The rationale of utilizing the limb facilities of this country as the data source for the Census is based upon the assumption that a relatively high percentage of new amputees visit these shops for the purpose of being fitted with a prosthetic device. It is believed that this percentage is materially higher today than it was in 1946, at which time a federally sponsored prosthetics research program was initiated. Since that date there has been a very marked improvement in the function and comfort of prostheses, and amputees who formerly were unable to pay for a replacement device now find that there are several Government agencies to assist them. These include the federally supported State Bureaus of Vocational Rehabilitation, the Children's Bureau, the Veterans Administration, and the Workmen's Compensation programs. It has been variously estimated by both surgeons and prosthetists that between 80 and 90 per cent of all new amputees desire a prosthesis. It is hoped that some spot checks can be made in a few large medical centers to document this estimate.

The project title, Amputee Census, is strictly speaking a misnomer (although it is a concise expression of the hoped-for result), since no national or regional head count of amputees is involved. In that only new amputee cases are included in this study, it will be possible to establish annual rates of amputation by age and cause. By applying life-expectancy tables to these rates, it is hoped to develop information that will bear upon the size of our amputee population. For example, it is obvious that there is a very wide disparity in the life expectancy of a 55-year-old man in good health who loses a limb by reason of an accident as compared with a man of the same age who suffers an amputation of his leg as the result of vascular disease. This quantitative study will not be undertaken until the census has been completed in the fall of 1964.

Two simple data-collection forms were devised that can be executed in a matter of minutes by limbshop personnel (Figs. 1 and 2). The participating limbshops were provided with bound books of these serially numbered forms. The books consist of original data slips that are retained by the facilities and carbon copies in the form of self-addressed and stamped postcards to be mailed to the National Academy of Sciences. It will be noted in Figures 1 and 2 that the upper left-hand corners of the data cards are blocked out. It is in this space that the name of the amputee appears on the

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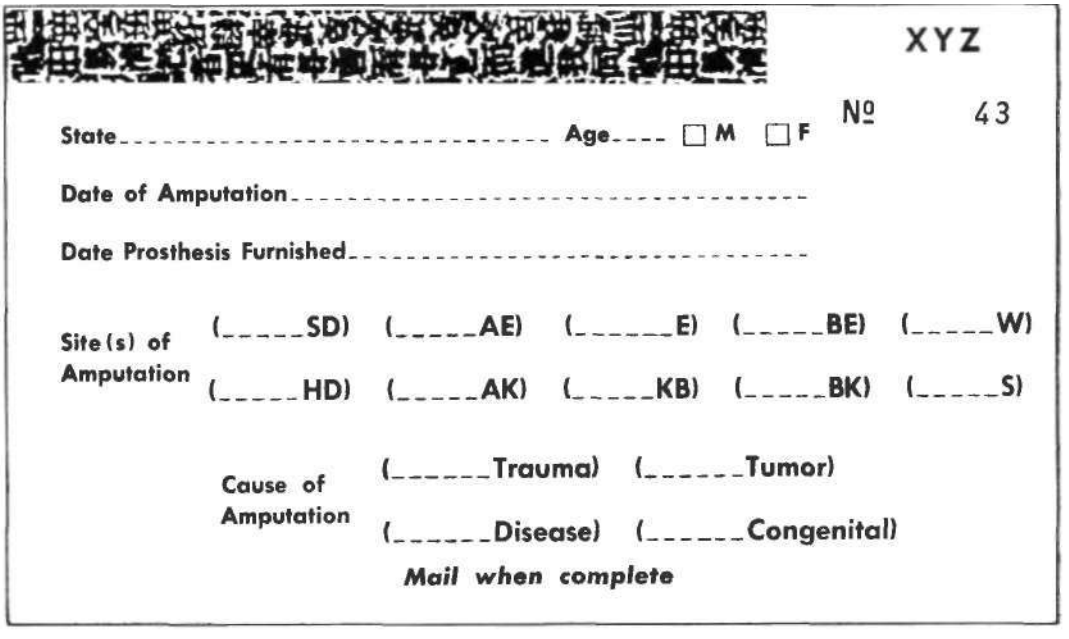

Fig. 1. Amputee Census Card No. 1. Data form for single amputations and multiple amputations that result from a single cause at the same time.

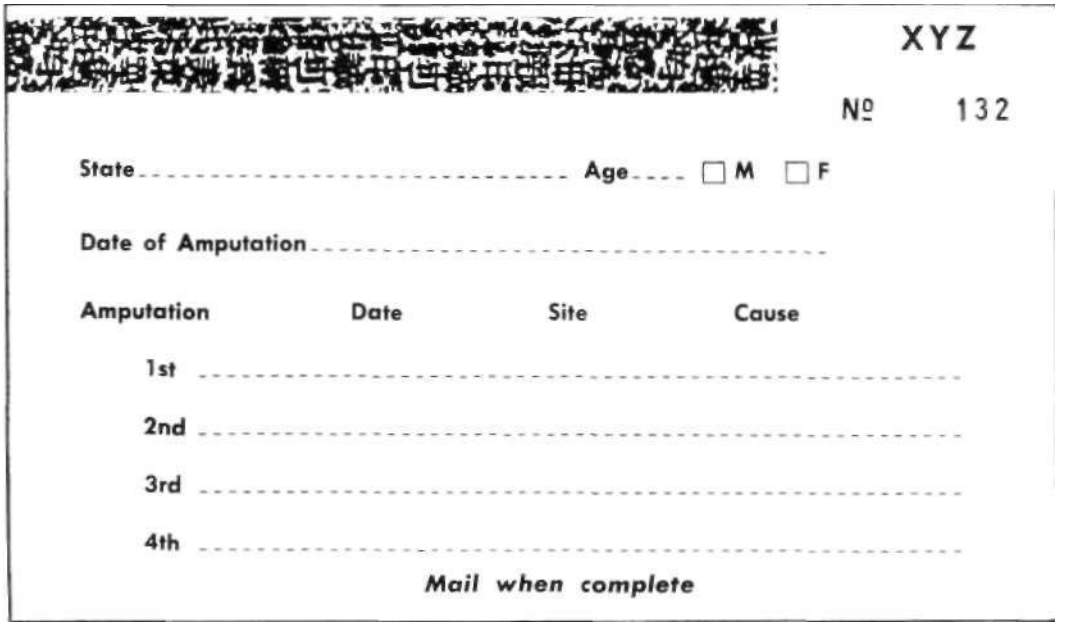

Fig. 2. Amputee Census Card No. 2. Data form for multiple amputations that occur serially at different times from the same or different causes.

original forms retained by the facilities. Since the cards are serially numbered, it will be possible at some future time to identify certain types of amputees for further study. In the upper right-hand corner is a symbol consisting of three capital letters that identify each facility. The code to these symbols is known only to the staff of CPEI, and the limbshops have been assured that no information concerning their volume of cases will be disclosed to anyone.

The participating facilities were instructed to fill out a card on each new amputee case for whom an original prosthetic device of some type was provided. Amputees furnished with a replacement for a worn-out or otherwise unusable limb are not recorded in this study. The

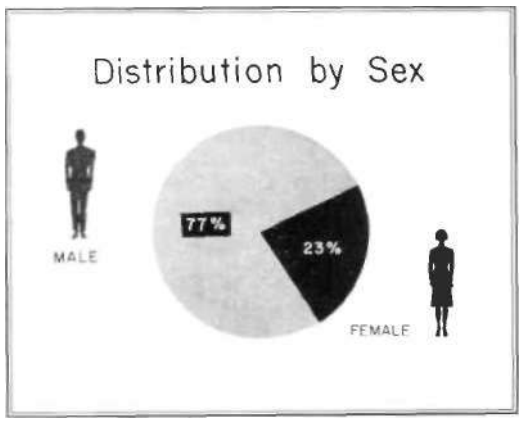

Fig. 3

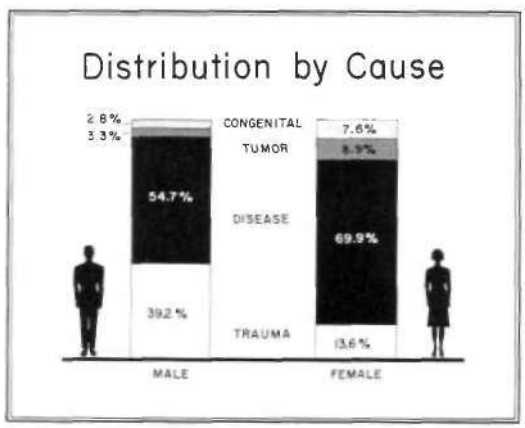

Fig. 4

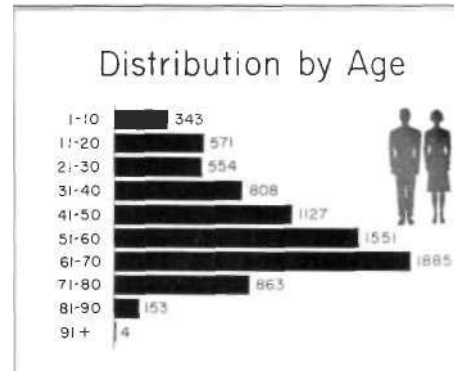

Fig. 5. Actual case numbers in each decade of life.

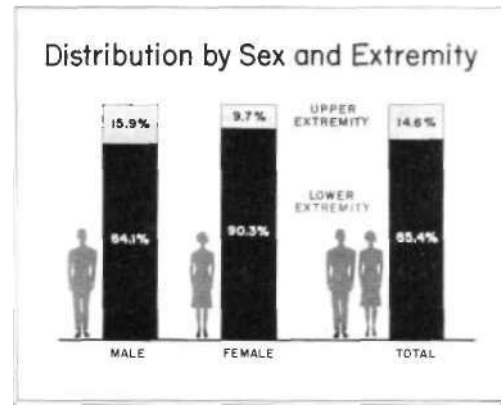

Fig. 6

card shown in Figure 1 is used for single amputations and for multiple amputations that occur simultaneously from a single cause. The card shown in Figure 2 is prepared for those cases that have had more than one amputation at separate times from either the same or different causes. Examples of this type of case include:

1. An individual who is a left, below-knee amputee due to an injury who, years later, becomes a right. above-knee amputee due to vascular disease.
2. An individual who is a left, below-knee amputee due to vascular disease and is converted into an above-knee case a year later.

Since this card amounted to only three per cent of the total data forms received, an analysis of

these cases will not be accomplished until the end of the project.

The following data items are entered on the census forms:

State of Residence.
Age.
Sex.
Date of Amputation.
Date Prosthesis Furnished.
Site of Amputation:
  Upper Extremity:
    (SD) Shoulder disarticulation (includes forequarter cases and very short above-elbow stumps that require fitting as an SD).
    (AE) Above elbow.
    (E) Elbow disarticulation.
    (BE) Below elbow.
    (W) Wrist disarticulation.
  Lower Extremity:
    (HD) Hip disarticulation (includes hemipelvectomies and above-knee stumps so short that they must be fitted as an HD).
    (AK) Above knee.
    (KB) Knee-bearing (includes knee disarticulations, Gritti-Stokes, etc.).
    (BK) Below knee.
    (S) Syme's operation or ankle disarticulation. (Partial-hand and partial-foot amputations are not included in the census.)
Cause of Amputation:
  Trauma—amputations due to physical and thermal injuries.

DISTRIBUTION BY SIDE OF AMPUTATION

Upper Extremity	
Left	49.2%
Right	50.8%
Lower Extremity	
Left	49.2%
Right	50.8%

Fig. 7

RATIO MALES TO FEMALES OF AMPUTATIONS BY CAUSE

Cause of Amputation	Males	Females	Ratio, Males-Females
Trauma	2330	243	9.2 to 1
Disease	3241	1250	2.6 to 1
Tumor	197	160	1.2 to 1
Congenital	168	136	1.2 to 1

Fig. 8

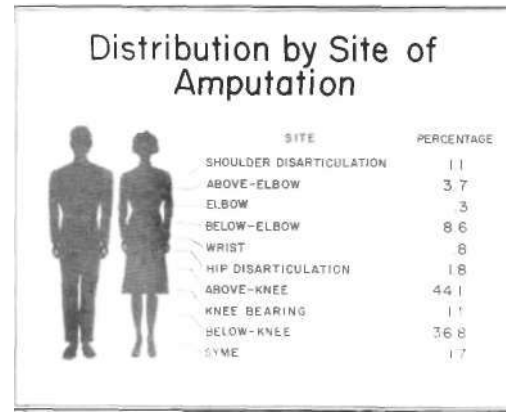

Fig. 9

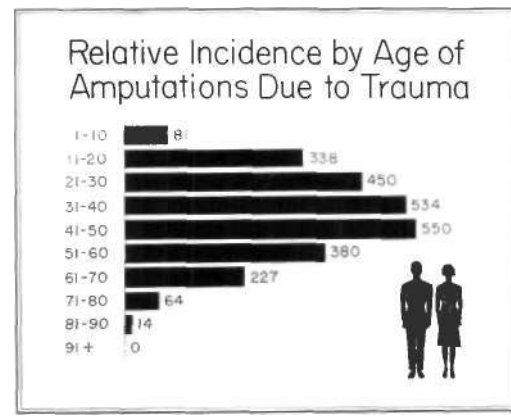

Fig. 10. Actual case numhers in each decade of life.

Disease—amputations due to vascular diseases and infections.
Tumor—refers to all types of growths for which an amputation is performed.
Congenital—only cases that are fitted with a prosthesis are included. The type of prosthesis is used to determine the level of "amputation." It is recognized that the data card is not appropriate for certain types of congenital amputees.

The statistical material that is presented in this preliminary report on the Amputee Census is based upon the data forms received from the prosthetics facilities during the 16-month period from October 1, 1961, through January 31, 1963. During this time, 8,416 new cases were reported. This sampling of the amputee population of the U. S. is sufficiently large so that the distribution by sex, age, side of amputation, levels of amputation, and causes of

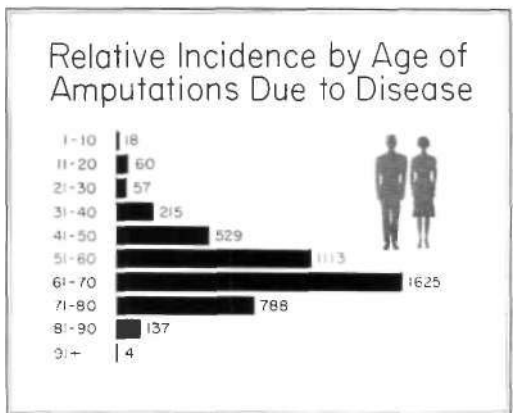

Fig. 11. Actual case numbers in each decade of life.

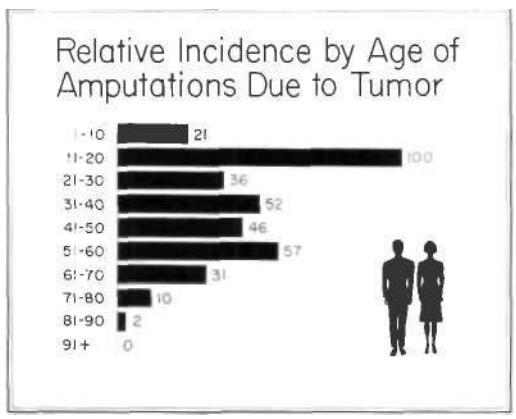

Fig. 12. Actual case numbers in each decade of life.

these new amputations is already well established. This conclusion is based upon the fact that the percentages presented in this report are almost identical to those that were obtained from an analysis of the first 5,000 cases. It is thus possible in this initial census report to present in graphic and tabular form (Figs. 3—13) a simple description of the group of individuals upon whom amputations are presently being performed. The following comments and observations on this statistical material are noteworthy:

1, The disparity in the amputation rates for males and females is due primarily to the facts that:
   a. Amputations in males by reason of injury are nine times as frequent as in females. This is due to the vocational and avocational hazards to which males are more liable (Fig. 8).
   b. Amputations in males by reason of disease are 2.6 times as frequent as in females (Fig. 8).
2. Amputations due to tumor are roughly comparable between the sexes (Fig. 8).
3. Congenital deformities of the extremities that are fitted with prostheses occur with almost equal frequency in males and females (Fig. 8).
4. There is no significant difference in the incidence of left- and right-sided amputations in either the upper or lower extremities (Fig. 7).
5. There is a surprisingly large number of lower-extremity amputees over 70 years of age who are being fitted with prostheses. In this series, they number 1,020, or 13.2 per cent, of the total number of reported cases. It will be noted that there are four who are over 90 years of age (Fig 5).
6. The incidence of malignancy resulting in amputation is fairly constant for individuals between 21-60 years of age. The decade 11-2C years has an indicated rate of twice that of any other ten-year period (F'ig. 12).
7. In this series there were 162 cases of multiple amputations that occurred from the same cause at the same time. Twenty-two were bilateral upper-extremity cases, 132 were bilateral lower-

DISTRIBUTION BY SITE, CAUSE AND SEX

		Trauma	Disease	Tumor	Congenital
S D	Male	37	7	10	7
	Female	2	4	12	4
A E	Male	223	13	7	10
	Female	15	6	8	8
E	Male	13	0	0	5
	Female	1	0	0	6
B E	Male	494	14	2	52
	Female	21	6	4	54
W	Male	38	2	0	7
	Female	4	2	0	7
H D	Male	20	18	45	3
	Female	3	16	33	1
A K	Male	606	1858	99	16
	Female	88	662	68	11
K B	Male	29	29	2	4
	Female	5	13	1	3
B K	Male	818	1265	27	49
	Female	91	533	32	32
Syme	Male	52	35	5	15
	Female	3	8	2	10

Fig. 13

extremity amputations, and eight involved one upper and one lower extremity.

8. During the 16-month report period there were 1,798 cases of below-knee amputations for disease. It is believed that the vast majority of this group falls into the vascular insufficiency category. During this same period there were 2,520 cases due to disease in which the initial amputation was above the knee. There is no reason to doubt but that similar numbers of below-knee and above-knee amputations for vascular disease have been performed in years past during comparable periods of time. Although theoretically the site of amputation in vascular disease is based on the level of vascular sufficiency in the extremity, it may be that too many surgeons are overly concerned with the possibility that amputations at the below-knee level will later require re-amputation above the knee. This possibility is suggested by the fact that in this series there were only 12 instances in which below-knee amputations due to disease were re-amputated at a later date. This is an extremely low incidence, considering the number of below-knee amputations that are performed annually for vascular conditions. A clinical study may be needed that is designed to define better the criteria that bear upon the decision as to the level of amputation in cases of lower-extremity vascular disease. The advantages of preserving the knee joint are obvious, especially in the older age group.
9. The reader must recognize that the foregoing statistical material relates only to new amputee cases. The statistics are not valid for the amputee population at large due to the wide variation in the life expectancy of various types of amputees.

ACKNOWLEDGMENTS

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