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Sites of Suicidal Gunshot Wounds

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ABSTRACT: Two hundred twenty-six suicides by firearms were analyzed to determine the entrance wound site. Overall, the head was the most favored site, accounting for 74% of the wounds; specifically, the right temple accounted for 39% of the wounds. The data were further examined in terms of specific weapon types. In the case of handguns, the preference for the temple was even more prominent, with this site accounting for nearly two thirds of the wounds. With long guns the predominance of head wounds was less pronounced but still present. Correlations with sex and age showed no significant differences in choice of site but did show differences in selection of gunshot as the means of suicide. Correlations of site with handedness showed that most individuals held true to form but that a significant proportion (8%) inflicted their wounds on the other side. Finally, three cases of suicide by multiple gunshots are presented.

KEYWORDS: pathology and biology, suicide, wound ballistics

Most forensic pathologists have formed opinions about the relative frequencies of various sites for suicidal gunshot wounds. Although perpetuated in print, these conclusions are for the most part based on personal experiences. We have been able to find only three documented studies dealing with this question; one of these [*1*] documented 121 handgun cases, one [*2*] 105 shotgun deaths, and the third [*3*] presented the results for very general sites (that is, head, neck, chest, and abdomen) in 450 cases involving all firearms.

Methods and Materials

We analyzed the records of all of the cases of suicidal gunshot wounds investigated by the King County Medical Examiner's Division during 1976, 1977, and 1978. During this period there were 517 suicide victims. In 226 of these cases firearms were the means of death, and these cases were analyzed for this study. Three individuals had more than one gunshot wound; they were treated separately and not included in the analysis.

Entrance gunshot wound sites were analyzed and ranked by frequency. The sites were also correlated with type of weapon and with the age, sex, and handedness of the individual. Locations were identified as listed in Table 1. In some instances, the definitions were arbitrary. For example, the temporal region was defined as the area within 7.5 cm (3 in.) from the external auditory meatus and included some wounds that had originally been described as parietal or mastoid. Other arbitrary definitions included the presternal region, defined as being within 2.5 cm (1 in.) of the midline, and the epigastrium, which extended from the

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TABLE 1—*Sites of suicidal gunshot wounds.*

Site	*n*	%
Total head	165	74
Right head, NOS	2	1
Left head, NOS	4	2
Right temporal	87	39
Left temporal	11	5
Right parietal	6	3
Left parietal	1	0.5
Occipital	1	0.5
Mid-frontal	18	8
Other frontal	3	1
Orbit	2	1
Nose	1	0.5
Mouth	20	9
Chin	2	1
Submental	7	3
Neck	10	4
Total chest	40	18
Presternal	13	6
Precordium	20	9
Other chest	7	3
Total abdomen	8	4
Epigastrium	5	3
Other abdomen	3	1
Total cases	223	100

xiphoid to the lateral costal margins. We were rather generous in our definition of the precordium in order to acknowledge the victim's conception of where the heart should lie. A few sites, such as the orbits, nose, and chin, were identified during the tabulation but included only one or two cases. They were, however, retained for the analysis. In six cases there was extensive tissue destruction, and entrance sites were not exactly determined. These were classified as "not otherwise specified" (NOS).

Results

The results are presented in Tables 1 and 2. Table 1 presents the data by site. Head wounds accounted for nearly 75% of the total. The right temple was the single most favored site, accounting for more than one third of all of the wounds. Table 2 lists the five most common wound sites in descending order of frequency. Again, the preference for the right temporal region is obvious, but chest wounds accounted for two of the more common sites. Figure 1 is a graphic presentation of the locations of the head and neck wounds.

Table 3 presents the data in terms of the type of weapon used. For clarity's sake the sites have been grouped. The temporoparietal region was the most favored site with handguns and, to a lesser degree, with rifles. In the case of shotguns, however, the most common single site was the presternal-precordial region of the chest. When grouped by the four major regions, and compared with handguns and rifles, shotguns had a significantly lower representation in the head wounds and a significantly higher representation in the neck, chest, and abdomen. Considering only the shotgun wounds in this more general classification, head wounds accounted for just over half of the wounds, while chest wounds accounted for approximately one third.

Correlations between entrance wound site and the sex of the decedent showed no significant or consistent differences. We reaffirmed the fact that men favor gunshot as a means of

TABLE 2—*Most common suicidal gunshot sites.*

Site	*n*	%
Right temple	87	39
Mouth	20	9
Precordium	20	9
Mid-frontal	18	8
Presternal	13	6

FIG. 1—*Approximate locations of 175 suicidal gunshot wounds to the head and neck.*

suicidal death; 50% of the suicides by men during this period were by gunshot, while only 25% of the women chose this means of death.

The deaths were subdivided into four age categories: under 19 years old, 20 to 39 years old, 40 to 59 years old, and over 60 years old. During the three years in question, there were no individuals under 13 who committed suicide by gunshot and the only one older than 69 had multiple wounds and was considered separately. Comparison of the entrance wound sites among these groups showed no significant preference. Again, however, there was a difference among the groups in their choice of gunshot as a means of suicide. The preference for firearms appeared to decrease with age; 65% of the 13- to 19-year-old group selected gunshot, 43% of the 20- to 29-year-old group, 40% of the 40- to 59-year-old group, and 24% of the 60- to 69-year-old group.

We correlated handedness with the side of the head on which the wound was inflicted. Handedness was recorded in the investigator's report in 113 cases. We restricted our analysis to 60 cases in which the wound site would dictate the use of one hand or the other, namely the temporal and parietal regions. The five left-handed individuals held true to form and inflicted their wounds on the left side. Of the 55 right-handed individuals, however, five (8%) had the entrance wound on the left side of their head.

TABLE 3—*Gunshot wound sites per type of weapon.*

Site	Handgun		Rifle		Shotgun	
	n	%	*n*	%	*n*	%
Head	116	82	38	67	11	47
Temporoparietal	88	62	16	28	4	17
Frontal	10	7	9	16	2	9
Mouth	10	7	6	11	4	17
Submental	3	2	3	5	1	4
Other head	5	4	4	7	0	0
Neck	1	1	8	14	1	4
Chest	23	16	8	14	8	35
Presternum and precordium	20	14	6	10	6	26
Other chest	3	2	2	4	2	9
Abdomen	2	2	3	5	3	13
Epigastrium	1	1	2	3	2	9
Other abdomen	1	1	1	2	1	4
Total	142	...	57	...	23	...

The three cases of multiple suicidal gunshot wounds had the following findings. All wounds were inflicted with handguns. A 60-year-old woman inflicted one wound in "other chest" (see Discussion) and another in the precordium. A 61-year-old man had two wounds in the epigastrium. An 80-year-old man had one wound in the precordium and a second in the mid-frontal region.

Discussion

Our analysis confirms previous, time-honored statements. For example, Gonzales et al [*4*] wrote that "the most common point of application is the right temporal region if the patient is right handed, and the left temporal region if he is left handed." This statement is certainly borne out by our data. Likewise, our results support Knight's statement [*5*] that "although, naturally, the right side is the most frequent with right-handed people, it is by no means unknown and not particularly suspicious if a right-handed person shoots himself through the left temple." Our data demonstrate a strong preference for wounding on the ipsilateral side, although sometimes the wound was on the other side; this finding alone should arouse no undue concern. Another of Knight's statements, "Any man found shot through the eye or the abdomen is unlikely to be a suicide as these sites are avoided by those intent on suicide," is partially supported by these data. In our cases, 8 (3.6%) of the wounds were in the abdomen and 2 (0.9%) in the eye.

Our ancillary findings, however, contradict another of Knight's statements. He states [*5*] that "a shot woman is a murdered woman until proven otherwise," because "women almost never commit suicide by shooting." In fact, during the years we studied, between one fourth and one third of the suicides by women were accomplished by shooting.

In Table 4 our data are compared with those of Hirsch and Adelson [*3*]. Their results were presented only in terms of the four general regions used in the table, and when our data are reduced to this format there are no significant differences. In Table 5 the data are compared with the previous studies [*1,2*] limited to handguns and shotguns. When data are presented in this fashion, there are, again, no significant differences.

It is of interest that both of the previous studies [*1,2*] found that women had a lower representation of head wounds than did men. In the handgun study [*1*] 88.9% of the wounds in men were in the head while only 48.4% of the women's wounds were to the head. In the shot-

TABLE 4—*Comparison with previous study of all gunshot wounds.*

	Hirsch and Adelson [3]		Current Study	
Site	*n*	%	*n*	%
Head	344	77	165	74
Neck	5	1	10	4
Chest	83	18	40	18
Abdomen	18	4	8	4
Total	450	100	223	100

TABLE 5—*Comparison with previous studies of handgun and shotgun wounds.*

	Handguns				Shotguns			
	Cohle [1]		Current Study		Mitchell and Milvernan [2]		Current Study	
Site	*n*	%	*n*	%	*n*	%	*n*	%
Head	95	79	116	82	53	51	11	48
Neck	...	...	1	1	...	...	1	4
Chest	22	18	23	16	38	36	8	35
Abdomen	4	3	2	1	14	13	3	13
Total	121	100	142	100	105	100	23	100

gun study [2] the difference was less pronounced but still present; 53.9% of the wounds to men were in the head and 31% of those to women. Our data were not reduced to this format, but for all types of weapons we found that 75% of the men's wounds were to the head and 72% of the women's wounds were to that site. This discrepancy is difficult to explain. It may, in fact, not be statistically significant; when the total number of cases is divided into these subcategories the sample size becomes relatively small. One of the previous authors [1] speculated that the lower number of head wounds in the women in his study was a result of their wish not to injure or mutilate their faces; one can carry this speculation one step further and postulate that Seattle women are less vain than those in Dallas.

As with wounds to the side opposite the dominant hand, the three suicides by multiple gunshots are significant not for their number but for their existence. They demonstrate that, although unusual (1.3% of our cases), suicide by this means is in no way impossible. As one would expect, all of the individuals had one of the wounds in a site that would not be immediately fatal or incapacitating. It is of interest that the wound classified as "other chest" was through the scar from the decedent's mastectomy, an operation that reportedly was a major factor in her depression.

These data do not offer any new or exciting discoveries, but they do lend substance to previous "clinical experience." Certainly if this type of information is to be used in differentiating suicide from homicide or accident, it is better to rely on numerical data rather than intuition or impression.

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