

THE RED CROSS WOUND CLASSIFICATION

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ICRC

THE RED CROSS WOUND CLASSIFICATION

ICRC SURGICAL ACTIONS



In 1990, 22 surgical teams were deployed in 14 hospitals in eight countries. 18,450 patients were treated.

FOREWORD

The International Committee of the Red Cross (ICRC) was founded in 1863; it promoted the Geneva Conventions which have been signed by 165 countries. These conventions protect victims of war, be they wounded, shipwrecked, prisoners of war or civilians. Furthermore, they protect the hospitals and the medical staff who care for the sick and wounded. Within the framework of these conventions, the mandate of the ICRC is to take action and propose humanitarian initiatives in armed conflict. Bringing surgical care to victims of war, whether combatant or civilian, where there is little or no medical infrastructure is an increasing part of the ICRC's activities.

Over the last 10 years, enormous experience has been gained in the surgical management of victims of war. The Medical Division of the ICRC is endeavoring to retrieve this experience; part of this retrieval takes the form of the Red Cross classification of wounds.

The Medical Division of the ICRC hopes to benefit the victims of war by passing on its experience to others who have to manage war wounds.

Dr. Remi Russbach,
ICRC Chief Medical Officer

INTRODUCTION

Surgeons from civilian practice may have no previous experience of managing war wounds. Preparation for war surgery involves an understanding of wounds. Texts concerning wound ballistics based on laboratory work are intended to provide a basis for understanding wound management. The most valuable information derived from these studies is that small missiles *may* cause large and serious wounds. Misunderstandings arise because these studies focus on bullets when, in armed conflict, the majority of wounds are actually caused by fragments from bombs, shells or mines. When undertaking war surgery, the surgeon rarely knows the weapon nor does he find a uniform pattern of wounding.

The surgical task presented by any wound depends on the wound severity i.e. the degree of tissue damage and also the structure(s) that may have been injured. Recognition of this demands a clinical classification of wounds that is based on the features of the wound and not on the weaponry or the presumed velocity of the missile.

The Red Cross wound classification is a system whereby certain features of a wound are scored: the size of the skin wound(s); whether there is a cavity, fracture or vital structure injured; the presence or absence of metallic foreign bodies. A numerical value is given to each feature as shown overleaf. The scores can later be graded according to severity and typed according to the structures injured.

This scoring system is intended for quick and easy use in the field.

Skin wounds

Cavity

Fracture

**Vital structure(s)
injured**

**Metallic fragments
(X ray)**



Fig 1A

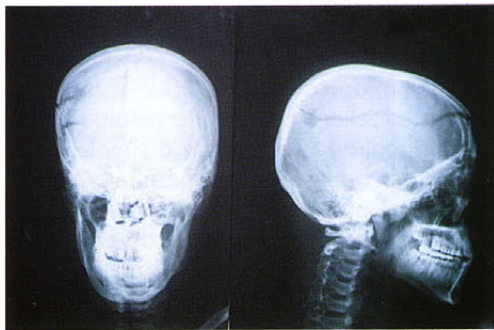


Fig 1B

A patient with a gunshot wound of the head. The entry is on the forehead. The radiographs (figure 1b) show the small entry and exit wounds of the cranium and a linear fracture. This is a serious wound because of the structure injured.

(E 1, X 1, C 0, F 1, V = N, M 0; Grade 1, Type VNF).



Fig 2A



Fig 2B

Fragment injury of the right leg. Both entry and exit wounds are large. This is a serious wound because of the amount of tissue damage. The patient subsequently had above knee amputation.

(E 25, ? X 5, C 1, F 2, V 0, M 0; Grade 3, Type F).

SCORING THE WOUNDS IN THE FIELD

Wounds are scored after surgery or initial assessment.

Epidemiological studies have shown that the Red Cross Wound Classification system gives excellent prognostic results in the case of war wounds of the extremities. The Classification is based on a simple clinical assessment of wounds that effectively represents the transfer of kinetic energy of projectiles to body tissues. Large wounds of the limbs are more serious and require greater resources. The same cannot be said of other parts of the body. This has caused the ICRC to revise the V = vital category.

- E = (entry) centimetres.** Estimate the maximum diameter of the entry.
- X = (exit) centimetres.** Estimate the maximum diameter of the exit (X = 0 if no exit).
- C = (cavity)**
C 0 Can the "cavity" of the wound take 2 fingers before surgery?
C 1 No: C = 0, Yes: C = 1
- This may be obvious before operation or only established after skin incision. For chest and abdominal wounds it refers to the wound of the chest or abdominal wall.
- F = (fracture)**
F 0 No fracture: F = 0. Simple fracture, hole or insignificant comminution: F = 1. Clinically significant comminution: F = 2
F 1
F 2
- V = (vital structure)**
V = 0 Are brain, viscera or major vessels injured? (**Revised**)
V = N (neurological) No vital structure injured.
Penetration of the dura of the brain or spinal cord. (This will include penetrating injuries of the head or paraplegia due to projectiles.)
- V = T (thorax or trachea) Penetration of the pleura or of the trachea in the neck.
V = A (abdomen) Penetration of the peritoneum.
V = H (haemorrhage) Injury of a major peripheral blood vessel, down to the brachial artery in the arm or the popliteal in the leg.
- V = N, T & A are subcategories of central wounds.
V = H is a subcategory of wounds of the limbs.
- M = (metallic body)**
M 0 Bullet or fragments visible on X ray. None: M = 0. One metallic body: M = 1. Multiple metallic bodies: M = 2.
M 1
M 2

ADDITIONAL POINTS ABOUT SCORING WOUNDS

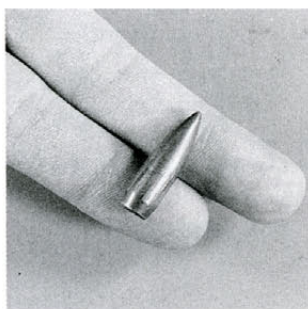
When it is not known which is entry and which is exit a “?” is put between the E and X scores.

When the wounds are multiple only the two most serious are scored.

When a wound cannot be scored “U/C” (unclassifiable) is written on the score. This applies to a minority of wounds.

When one missile causes two wounds e.g. through the arm and into the chest, the 2 separate scores are joined by a bracket.

It is not necessary to score all six points; it is usually possible to give E, F and V scores.



Estimating the presence of a cavity by the width of two fingers is inelegant but simple and effective; it represents slightly more than the length of most bullets. In a wound that admits two fingers, something other than laceration by a bullet travelling sidelong must have taken place; a C1 wound is likely to have significant tissue damage of whatever cause. This should not be confused with the phenomenon of temporary cavitation.

Figure 3a. Gunshot wound of the leg (radiograph); F 1 fracture of the tibia.

Figure 3b. Gunshot wound of the leg (radiograph); F 2 fracture of the tibia.

Figure 3c. Gunshot wound of the leg (radiograph); F 1 fracture (insignificant comminution) of the fibula.



Fig 3 A

Fig 3B

Fig 3C

A vital injury implies a more dangerous wound. The outcome of injuries to the head, thorax or abdomen, or causing massive peripheral haemorrhage, are only partly determined by the clinical size of the wound as defined by the RCWC. Mortality studies have shown this to be the case. A vital injury involves a surgical task in addition to simple wound management e.g. craniotomy, chest drainage, or laparotomy. V = H includes the popliteal and brachial vessels but not the vessels more distal.

It is important that the difference between an intact bullet (M1) and a fragmented bullet (M2) is recognised because of the relationship between bullet fragmentation and wound severity.

The scoring system is still valid without radiography; in this case the F score is judged clinically and the M score is omitted.

Once scored, the wound can be *graded* according to severity using the E, X, C and F scores, and *typed* according to structure by the F and V scores.

SUBSEQUENT ANALYSIS

GRADING THE WOUND ACCORDING TO AMOUNT OF TISSUE DAMAGE

Wounds can be graded 1, 2 and 3 from the E, X, C and F scores.

GRADE 1. Wounds where E plus X is less than 10 with scores C 0 and F 0 or F 1 (low energy transfer).

GRADE 2. Wounds where E plus X is less than 10 with scores C 1 or F 2 (high energy transfer).

GRADE 3. Wounds where E plus X is 10 or more with scores C 1 or F 2 (massive wounds).

TYPING THE WOUND ACCORDING TO STRUCTURES INJURED

Wounds can be typed ST, F, V and VF from the F and V scores.

TYPE ST. Wounds with F 0 and V 0 (soft tissue).

TYPE F. Wounds with F 1 or F 2 and V 0.

TYPE V. Wounds with F 0 and V = N, T, A or H.

TYPE VF. Wounds with F 1 or F 2 and V = N, T, A or H.

Grading and typing place any regional wound in one of twelve categories each of comparable clinical significance. The clinical examples shown indicate the grade and type of the wound deduced from the score.

12 CATEGORIES			
	Grade 1.	Grade 2.	Grade 3.
Type ST	Small, simple wounds	2 ST	3 ST
Type F	1 F	2 F	3 F
Type V	1 V	2 V	3 V
Type VF	1 VF	2 VF	Large wounds threatening life or limb

A wound such as traumatic amputation which cannot be scored easily can be categorised; grade 3, type F below the knee, and grade 3, Type **VHF** above the knee. Subcategory types of V wounds are now included: VN, VT, VA, and VH.



Fig 4A



Fig 4B

Gunshot wound of the left arm. The entry is indicated by the forceps; the large exit is in the forearm. The radiographs (figure 4b) show the extent of the fracture of the radius and ulna. (E 1, X 12, C 1, F 2, V 0, M 0; Grade 3, Type F).



Fig 5A

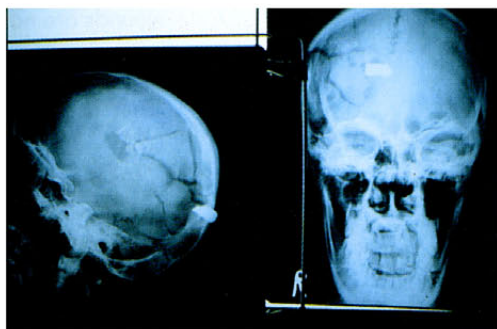


Fig 5B

Fragment injury of the head. The brain is exposed. The radiographs (figure 5b) show that there is significant bone loss and the metal fragment has reached the occiput. (E 4, X 0, C -, F 2, VN, M 1; Grade 2, Type VNF).



Fig 6A



Fig 6B

Missile wound of the abdominal wall. Small bowel is extruded from the larger wound. Figure 6b shows the surgeon assessing the wound cavity. Although the peritoneum was breached, the viscera were intact.

(E 1, ? X 5, C 1, F 0, VA, M 0; Grade 2, Type VA).



Fig 7A



Fig 7B

Missile injury of a child's left arm. The radiographs (figure 7b) show comminution of the distal humerus. The brachial vessels were not involved.

(E 15, X -, C -, F 2, V 0, M 0; Grade 3, Type F).



Fig 8A



Fig 8B

Gushot wound of the left leg. The entry is the small wound on the lateral side of the leg. There are at least two exit wounds because the bullet fragmented in impact (the metal fragments and the fractured fibula can be seen on the radiographs – figure 8b). The foot is ischaemic. (E 1, X 6, C 1, F 1, V 0, M 2; Grade 2, Type F).

Radiograph of a thigh injured by a bullet which has fragmented. The extent of comminution of the distal half of the femur and the metallic fragments are evident (F2 M2). Review of radiographs indicate the incidence of such wounds.



Fig 9

The Red Cross classification permits consideration of wounds as surgical lesions rather than weaponry phenomena; it refines the heterogeneity of wounds according to their clinical significance.

The limitations of the scoring are recognised; complete accuracy cannot be obtained. It should be emphasised that the scoring is for rapid use under adverse conditions and uses no additional equipment. The advantages of using the classification outweigh any disadvantage that may be introduced by observer error in occasional patients.

APPLICATIONS OF THE CLASSIFICATIONS ARE:

- **Wound assessment**

Wounds are scored in all ICRC hospitals. A surgeon is assessing wounds in surgical terms if he scores them. Surgical communications about wounds is facilitated.

- **Establishing a scientific approach to war surgery**

The classification permits comparison of treatments of like wounds and prognoses of allied wounds. The example of a "gunshot wound of the thigh" pertains: the treatments and prognoses differ according to amount of tissue damage, the degree of bone comminution and whether the femoral vessels are injured. Before it can be determined whether external skeletal fixation or skeletal traction is best for femur fractures, the patients' wounds must be categorised according to grade and type.

- **Surgical audit**

The performance of individual hospitals, medical teams or surgeons could be measured by mortality, morbidity and use of resources within comparable categories. An example, relating to the adequacy of the primary wound surgery, is the number and cause of deaths associated with VO wounds.

- **Wound information from the field**

The ICRC hospitals treat more than 4,000 penetrating wounds a year; analysis of a larger number of scored wounds will eventually clarify the relationship of experimental wound ballistics to the management of war wounds.

MISSION

The International Committee of the Red Cross (ICRC) is an impartial, neutral and independent organization whose exclusively humanitarian mission is to protect the lives and dignity of victims of war and internal violence and to provide them with assistance.

It directs and coordinates the international relief activities conducted by the Movement in situations of conflict. It also endeavours to prevent suffering by promoting and strengthening humanitarian law and universal humanitarian principles.

Established in 1863, the ICRC is at the origin of the International Red Cross and Red Crescent Movement.

