

Assault Rifles; Definitions, Evolutionary History and Medical Consequences

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Introduction

During the last 12 to 24 months the term "assault rifle" has burgeoned in the lay press. These weapons are now being frequently associated by the media with lethal and high morbidity injuries to increasing numbers of law enforcement officers and civilians. In response to this, questions have arisen as to the rationale of availability of these weapons as well as the medical consequences of wounds from such weapons.

This article examines the definition and evolutionary history of assault rifles and very briefly reviews the medical consequences of such weapons. The purpose of this article is not to discuss the treatment of wounds from such weapons, but to introduce them to medical personnel who have no background or knowledge of such weapons but may have some interest and clear up some of the myths surrounding these weapons.

Definitions

The classic definition of an assault rifle is as follows (See Figure 1): It is a shoulder-fired, held-held weapon, thus being a rifle. It fires an "inter-

Figure 1

ASSAULT RIFLES	
Definition	
■	shoulder-fired firearms
■	selective fire
■	intermediate-sized cartridge

mediate" sized cartridge, i.e. intermediate between pistol cartridges and the cartridges used in "full size" military and hunting rifles (See Figure 2). It also is capable of selective fire, i.e. it can fire either a single shot for each pull of the trigger (semi-automatic), or can fire in a full-automatic mode, which means projectiles will be fired continuously as long as the trigger is held down or until the cartridge magazine runs out.¹ Some of these weapons also have a "burst" setting which allows for a certain preselected number of cartridges to be fired with each single pull of the trigger.

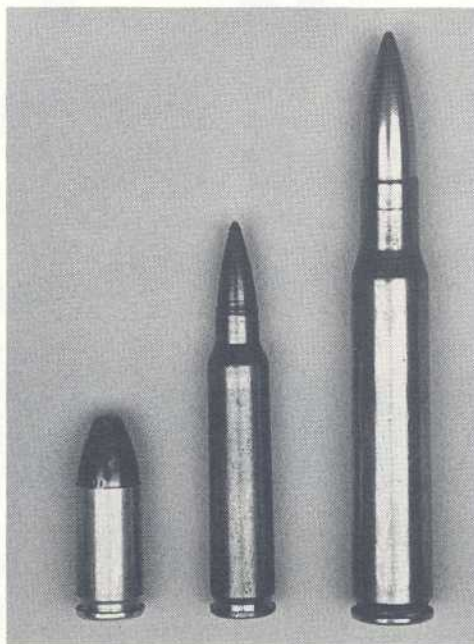


Figure 2. Cartridge Sizes

Left to Right: pistol cartridge (9mm Luger); intermediate-size cartridge (5.56mm M-16); full-size military service cartridge (.30-06 Garand)

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By use of this classic definition it is important to realize that weapons referred to in the lay press as assault rifles are often incorrectly named. Many of the weapons so incorrectly referred are in fact automatic pistols (often called machine pistols) as they fire pistol-size cartridges. By way of example, some names of automatic pistols (AP's) often seen in the lay press are: Uzi, MAC-10, MP-5, etc. AP's are actually in many cases preferred over "assault rifles" for street crime because of their small size and concealability.

The other major error in correct utilization of the "assault rifle" nomenclature concerns the true availability of such weapons. Selective-fire weapons are for general purposes unavailable through legal means to private citizens in the United States. The special federal permits required for private citizen possession of such weapons make this so. The

weapons that are legally available under current law to private citizens for purchase at retail stores are semi-automatic "look-alike" weapons, thus can fire only one shot per pull of the trigger. Such weapons are more correctly referred to as semi-automatic rifles (SAR's), or if firing pistol cartridges; semi-automatic pistols (SAP's) (see Figure 3). Recent federal legislation has made some of these semi-automatic "look-alike" weapons less available to the public by restricting import, production or sales. Some states have banned or restricted sales of these semi-automatic weapons.

History of the Assault Rifle

Technically speaking the first assault rifle by definition was a weapon designed by Federov in 1912 and adopted by the Russian army in 1916 as the Federov Avtomat (FA-16).^{1,2} Interestingly, it fired



Figure 3. Semi-automatic "look-alike" rifles and pistols

Top to Bottom: MAC-10 (S.A.P. version of MAC-10 A.P.); AKS (S.A.R. version of AK-47); AR-15 (S.A.R. version of M-16)

a Japanese 6.5mm × 50mm cartridge (See Figure 4) saw only limited use and was eventually lost in obscurity.

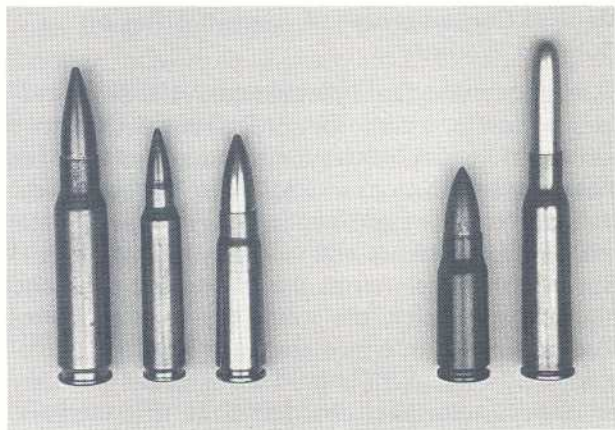


Figure 4. Intermediate-size cartridges for assault rifles

From Left to Right:
Group 1 (currently active cartridges)
7.62 × 51mm NATO
5.56 × 45mm M-16
7.62 × 39mm AK-47
Group 2 (obsolete cartridges)
7.92 × 33mm MP-43/StG-44
6.50 × 50mm FA-16

The design principles of current assault rifles grew out of the aftermath of the first world war. German military designers after studying data collected during the war, realized that overwhelmingly most opponents were shot within a 400 meter range rather than at extreme distance as previously thought.² Also, targets were most often available during assaults or other close action making a full-automatic weapon more advantageous. Their rationale was, therefore to develop a weapon that functioned and could be aimed as a full-size rifle but would use an intermediate rifle cartridge that had good ballistic principles out to a maximum of 500-600 meters.² The advantage of a smaller, lighter cartridge was that more could be carried by each soldier. Since further fields of fire were by their data, not necessary, they felt the increased accuracy at longer distances of larger cartridges not necessary for this new weapon. Such a change in philosophy also allowed the designers to shorten both the barrel and bolt-carrier/receiver lengths of such weapons to karabiner (carbine) length, resulting in a weapon lighter and easier to carry.^{2,3} The shorter, less powerful cartridge also would allow the weapon to be fired in a sustained

full-automatic mode without the uncontrollable vibrations produced by full-size cartridges when fired in this manner.² At that time there was no such weapon currently available. Many countries had experimented previously with producing full automatic rifles utilizing standard full-size military service cartridges. All were failures because the combination of a high powered cartridge and a long bolt carrier/receiver mechanism made the weapons un-aimable and dangerous due to the severe vibrations during full automatic fire. Also, currently available machine guns were much too heavy to be carried and shoulder fired by individual soldiers. Machine pistols, which had appeared by the end of the war fired in a full-automatic mode but were inaccurate at any distance beyond a few feet.

Therefore, the German General Staff in the 1930's commissioned two companies (Walther and Haenel) to design and produce a prototype weapon utilizing an intermediate-size cartridge. The prototype eventually accepted by actual combat trials in the early 1940's was the Mkb-42(H) (maschinen-Karabiner-1942, Haenel version) designed in part by Hugo Schmeisser and fired a new 7.92mm × 33mm cartridge, (see Figure 3). However when presented to Chancellor Hitler, he vetoed the project, supposedly based on his experiences as a rifleman in the trenches of the first world war.^{2,4} Another, more practical reason was that there were at that time eight thousand million (8 milliard) rounds of full-size 7.92mm × 57mm (8mm Mauser) ammunition in stock and this new rifle used the new 7.92mm × 33mm (kurtz) cartridge.⁴ However, the General Staff realizing the need for the weapon, adopted subterfuge. They renamed the weapon the MP-43 (machine pistol, 1943) and had it placed into full-scale production. It achieved such success and was in such demand on the eastern front where it was introduced, supply could not keep up with demand. After the weapon's success was assured, the General Staff reintroduced the weapon to Hitler by issuing them to his personal bodyguards.^{2,4} It is said that upon realizing his mistake and in a face-saving move immediately adopted the weapon formally and ordered the name of the weapon changed. He renamed it the StG-44 (Sturmgeweher, 1944).^{2,3,4} In German, geweher is the word for rifle and sturm (storm) in this context means to assault. Thus the word assault rifle was coined by no less a notorious figure than Adolf Hitler himself. (Perhaps this by itself is enough to give the term bad press.)

The weapon might have drifted into obscurity at the end of World War II, such as the fate of the previously mentioned Federov Avtomat, if not for

the Russian army. They had recognized the advantages of such a weapon over that of their own machine pistols. Therefore they commissioned Mikhail Kalashnikov, a Russian tank commander and weapons designer, to develop a StG-44 style weapon that could be mass produced in large numbers with Russian production techniques.² This was not easy as Russian factories were not capable of the finish and high tolerances of the StG-44. Therefore, Kalashnikov produced a simplified weapon that could be produced in large numbers in simply equipped factories. The weapon had very loose tolerances, but worked well and fired a 7.62 × 39mm intermediate cartridge (See Figure 4). It was adopted by the Russian military in 1947 and became designated the Avtomat Kalashnikova, 1947 or AK-47 (See Figure 5) and saw general service as early as 1951.^{2, 3}



Figure 5

AK-47 Type Assault Rifle

The serendipity of this weapon was that it was the loose tolerances and simplicity of design that resulted in its become the archetypical assault rifle for guerrilla forces over much of the world. Unlike some other assault-styled weapons; notably the American M-16, requiring strict care and maintenance in order to continue to function, the AK-47 required none. Therefore, with approximately 5 minutes of training, an untrained guerrilla fighter could be issued an AK-47 and become a dangerous adversary. The weapon requires essentially no cleaning or care and has thus been adopted by guerrilla fighters the world over. Over 35 million kalashnikovs are said to have been made in the last 30 years, more than any gun in history.² Many of the current styles of "assault rifles" produced by

many major countries as well as third world countries are variations on the theme of the design of the AK-47.

Medical Consequences of Assault Rifles on Gunshot Wounds

Weapons that fire intermediate, rifle-sized cartridges such as assault rifles (AR's) and SAR's have some differences in wounding characteristics as compared to handguns or SAP's and full-size rifles. Ballistics experts argue continuously over the interrelationships of mass and velocity in wounding.^{5, 6} But in very simple terms the greater the mass and higher the velocity, the worse the wound. Therefore, at close to intermediate range (out to 500 meters), AR's and SAR's produce wounds that may be as devastating as some full sized rifle wounds. But at far distances they will not deliver as much kinetic energy as accurately to the target as a full sized rifle. Another factor in wounding by these weapons is that cartridges for these weapons; AR's or SAR's, are almost invariably military type ammunition which means that projectile carries a "full metal jacket." This was mandated on all military ammunition since 1889 so that military projectiles would not "mushroom" like the soft lead projectiles in hunting rifle cartridges.⁷ The mushrooming effect is imminently more destructive for a variety of ballistic reasons.^{6, 8} Full metal jacket projectiles are not supposed to deform and therefore are supposed to produce less damage. Thus, in general a person shot by a hunting rifle projectile potentially may be much more seriously injured than a similar entry wound from an AR or SAR. There may be exceptions to this rule as some full metal jacket projectiles such as the M-16 projectile are reported to have a tendency to splinter from the base and produce deforming and multiple fragments.⁸

Wounds from AR's and SAR's are potentially more devastating than pistols and AP's/SAP's which fire low-velocity pistol cartridges. The exception would be near-target wounds from higher velocity "magnum" style handguns which can provide significant wounding at those distances. AP's and SAP's do not fire magnum-style cartridges.

Another consideration is multiplicity of wounds. Multiple wounds are almost always imminently more devastating than single wounds. Any weapon that can be fired multiple times has the capability of inflicting multiple wounds. Questions of relationships between rapid multiple firing and accuracy are beyond the scope of this paper. However, rapid repeatedly fired weapons are very inaccurate, especially at any significant distance from the target.

This again makes the AP/SAP much more desirable to many criminal elements as much of the gunshot wounding seen from street crime is produced at close range.

As always, knowledge of the weapon used in a shooting incident is of some aid to the clinician in helping to access the severity of a particular wound. However, this knowledge is often over emphasized and does not replace good general wound care principles,⁶ as have been outlined by such organizations as the American College of Surgeons, the American Trauma Society, the American College of Emergency Physicians, etc.

Summary

In summary, the evolutionary history of assault rifles may be of interest to some medical practitioners. It is important to realize that the term "assault rifle" is incorrectly and overused in the lay press. As a rough generalization, the wounds from such weapons may fall in between those of handguns on one side and full-sized rifles on the other. The major caveat is that there can be major variations in the severity of any wound by any weapon and though it may be of some help in analyzing potential damage, knowledge of the inflicting weapon does not replace the need for good, well established principles of wound management.

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