

## Ballistic Examination Findings of Sawed-Off Shotguns Referred to Council of Forensic Medicine, Istanbul, Turkey

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**Abstract:** A sawed-off shotgun is a type of shotgun with a shorter gun barrel and often a shorter or absent stock. Due to a lower muzzle velocity and wider spread of shot these sawed-off shotguns have a shorter effective range. In spite of these disadvantages, the main purpose of shortening the barrels is to make them easier to conceal and transport. In this study, researchers aimed to document the findings of shots on experimental targets at different ranges by use of a sawed off and a regular shotgun. Reports of Ballistic Division of Physical Examination Department of Council of Forensic Medicine between the years 2009 to 2012 were retrospectively searched. Reports on sawed-off shotguns were evaluated on the basis of the type of the weapon, length of the barrel, ratio of the barrel length to the whole length, caliber, firing ability. Total files of the Ballistic Division between the years 2009 to 2012 were 6199. Retrospective evaluation of the files revealed presence of total 48 sawed-off shotgun cases. Trial shots by a sawed-off shotgun revealed similar defects on the cotton targets with the shots of a regular shotgun for the ranges of 50, 75 and 100 cm. These kinds of shotguns are being used in criminal acts mostly for the purpose of concealing it easily. The range of fire of these shotguns and the overall effects may be different due to shorter barrel length. In evaluation of cases with these guns this issue must be in mind. In order to decrease the use of sawed off shotguns in criminal acts in the country these kind of shotguns must be accepted as handguns due to lacking the nature of being a shotgun and the penalties must be imposed accordingly.

**Key words:** Shorter gun, muzzle velocity, weapon, caliber, firing ability

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### INTRODUCTION

The acquisition and possession of firearms is limited by law in most countries including Turkey as well. This strict limitation to possess a handgun directs people to have shotguns in many regions of the country. In rural settings this preference of shotguns is more prominent. The regular shotguns differ from rifles and handguns in construction, ammunition, ballistics and use. Shotguns have a smooth bore and they are usually employed to fire multiple pellets though having the ability to fire a single projectile (Saribey *et al.*, 2009; Ladenheim and Ladenheim, 1996; Vincent and DiMaio, 2000). Their legislation to possess for hunting also differs separately for the purpose of hunting, etc. A variety of legislations concerning hunting in many countries regulate the use of standard shotguns and related accessories. The ease of obtaining the license needed to possess the shotguns

increases the use of shotguns in criminal acts in some regions. In addition to the use of standard shotguns (Turkish Standards Institution, 1998) for the purposes of those other than hunting, sawed-off shotguns constitute a different category of shotguns and being encountered in criminal acts with an increasing number (Perdekamp *et al.*, 2008).

A sawed-off shotgun is a type of shotgun with a shorter gun barrel and often a shorter or absent stock. Due to a lower muzzle velocity and wider spread of shot these sawed-off shotguns have a shorter effective range. In spite of these disadvantages, the main purpose of shortening the barrels is to make them easier to conceal and transport.

The use of these kinds of shotguns in criminal offences may result in atypical wounds and so, wound patterns of different ranges need to be documented in order to reach a conclusive statement (Perdekamp *et al.*,

2008). In this study, researchers aimed to document the findings of shots on experimental targets at different ranges by use of a sawed off and a regular shotgun.

## MATERIALS AND METHODS

Reports of Ballistic Division of Physical Examination Department of Council of Forensic Medicine between the years 2009 to 2012 were retrospectively searched. Reports on sawed-off shotguns were evaluated on the basis of the type of the weapon, length of the barrel, ratio of the barrel length to the whole length, caliber, firing ability.

## RESULTS AND DISCUSSION

The total files of the Ballistic Division during the study period were 6199. Retrospective evaluation of the files revealed presence of total 48 sawed-off shotgun cases. The sawed-off shotguns cases constituted only 0.8% of all ballistic cases of the council.

In 2009, 1994 ballistic files and 8 sawed off shotgun cases were examined in total. In 2010, 1617 ballistic files and 14 sawed off shotgun cases; in 2011, 1943 ballistic files and 16 sawed off shotgun cases and finally in 2012, 1095 ballistic files and 10 sawed-off shotgun cases were investigated. When the caliber of these modified shotguns was considered, it was ranging between 9 and 36 mm. One of them was 9 bore, 10 were 12 bore, 24 were 16 bore, 4 were 20 bore, 2 were 28 bore, 1 was 32 bore and 6 were 36 bore.

The majority of the modified shotguns were single barreled (40.8%). Six of the shotguns were double barreled. Three of the shotguns were semi-automatic.

After measuring the dimensions of these 48 sawed-off shotguns, overall lengths ranged between 18.5 and 68 cm. Barrel lengths of the modified shotguns ranged between 3.3 and 32.8 cm (excluding chamber). The overall length of the shotguns ranged between 9.4 and 39.8 cm (including chamber). Distribution of the shotguns according to barrel lengths and overall lengths is shown in Fig. 1 and 2.

After evaluation of the shotguns by trial shots at laboratory, 45 of those were detected to successfully fire appropriate pellets. There was mechanical failure detaining firing in 3 of the shotguns.

Upon determination of dimensions of these 48 modified shotguns, 46 were classified according to law 6136 and accepted as a pistol. Two of them were non-standard shotguns in terms of dimensions but not classified as pistols.

Trial shots were performed by using one modified shotgun shown in Fig. 3a (Barrel length 71.2 cm, total

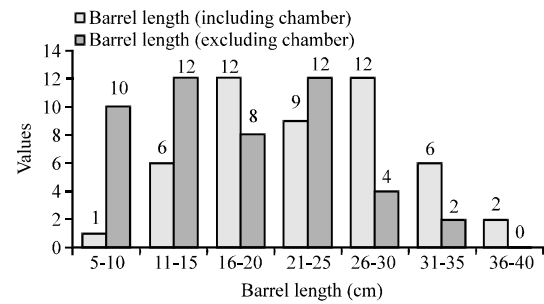


Fig. 1: Distribution of sawed-off shotguns according to barrel length

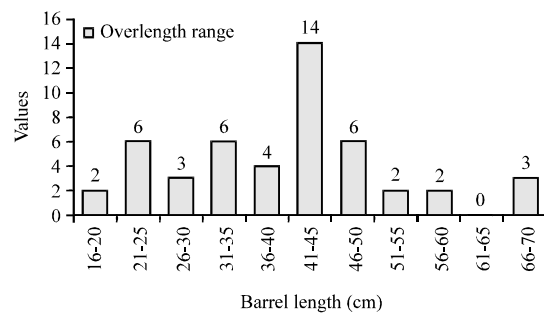


Fig. 2: Distribution of sawed-off shotguns according to overall length



Fig. 3: a) A modified shotgun referred to ballistic department for evaluation; b) A non-modified shotgun referred to ballistic department for evaluation

length 118.5 cm) and by a non-modified shotgun shown in Fig. 3b and the figures of damages at various ranges of fire are shown in Fig. 4-7.

Strict legal regulations possessing a handgun direct people to have shotguns and/or blank cartridge (modified) pistols (Uzun *et al.*, 2009; Buyuk *et al.*, 2009). In order to conceal and easily transfer, shotguns are sawed off and hence, referred to ballistic departments for analysis on the basis of the related penal code.

This retrospective study confirms the findings of (Saribey *et al.*, 2009) about the fact that 12 and 16 bore calibers are the most preferred calibers in Turkey. These



Fig. 4: a) The defect on a cotton target by shot of the modified shotgun: the range of fire is 100 cm; b) the defects on a cotton target by shots of the non-modified shotgun: the ranges of fire are 100, 200, 300 and 400 cm

calibers constitute the 54% of all sawed-off shotguns referred to Ballistic Department of Council of Forensic Medicine. These calibers are normally the most preferred calibers of shotguns in Turkey (Uner *et al.*, 2003).

The examination of the shotguns and all other weapons are carried out according to the legal restrictions defined in the associated legislation of the country and so, the definition of a sawed-off shotgun is based on these legal issues. Shotguns are governed by law 2521 in Turkey. The 6136 law is the main law governing the firearms except for shotguns but modified weapons are

also evaluated according to this law. For the modification of the shotguns, sawing off the barrel is the most commonly encountered condition. For the decision of a modified shotgun the main classification criterion is the barrel length. According to the current legal legislation in Turkey if a shotgun has a overall length (including chamber) below 50 cm and a barrel length (excluding chamber) below 30 cm, it is accepted as a pistol.

In Australia, a shotgun may not have its barrel shortened so as to change the category under which that shotgun would be classified. In Canada, short-barreled,



Fig. 5: a) The defect on a cotton target by shot of the modified shotgun: the range of fire is 75 cm; b) the defect on a cotton target by shot of the non-modified shotgun: the range of fire is 75 cm



Fig. 6: a) The defect on a cotton target by shot of the modified shotgun: the range of fire is 50 cm; b) the defect on a cotton target by shot of the non-modified shotgun: the range of fire is 50 cm



Fig. 7: The defects on the wood material just beneath the cotton target by shots of the non-modified shotgun: the ranges of fire are 30, 40, 50, 60, 75 and 100 cm

manually operated shotguns are non-restricted as long as the barrel remains unmodified from the original factory length. There is no legal minimum for shotgun barrels as long as they are not handguns. In United Kingdom, a shotgun cut down so that the barrel is shorter than 60 cm or the overall length is less than 102 cm is deemed to be a short-barreled shotgun and restricted.

Trial shots by a sawed-off shotgun revealed similar defects on the cotton targets with the shots of a regular shotgun for the ranges of 50, 75 and 100 cm. These kinds of shotguns are being used in criminal acts mostly for the purpose of concealing it easily. The range of fire of these shotguns and the overall effects may be different due to shorter barrel length. In evaluation of cases with these guns this issue must be in mind. It is reported that these sawed-off shotguns have a shorter effective range due to a lower muzzle velocity and wider spread of shot (Perdekamp *et al.*, 2008). But the trial shots revealed similar entrance defects at ranges of 50, 75 and 100 cm. There may be differences below 50 and above 100 cm of ranges of fire.

It is reported that there may be atypical changes at entrance wound due to rapid spread of energy from the shortened barrel (Perdekamp *et al.*, 2008). It can be said that preference of these sawed-off shotguns is mainly based on the fact that they can be easily carried and concealed. Shortening of the barrel does not affect the entrance defect significantly up to 100 cm of range of fire. The distribution of the pellets can be expected after 100 cm but the distance up to 100 cm seems to be enough for the targets.

## CONCLUSION

In order to decrease the use of sawed off shotguns in criminal acts in the country these kind of shotguns must

be accepted as handguns due to lacking the nature of being a shotgun and the penalties must be imposed accordingly. The non modified guns can be cheaply provided without weapon licence and they are turned into sawed off type very easily. The sawed of guns do not have any value ballistically like cartridge bullet and they can be easily modified causing a frequent usage of these guns as criminal means. The presence of such kind of guns also generates danger for the human health.

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