Patologie 4-10 22.10.2010 11:51 Str. 54
proLékaře.cz | 20.9.2026

# THE EFFECT OF THE HOME SHOOTING PERCUSSION PISTOL ON SKULL SUBSTITUTE BONES

**Krajsa J.[1], Hirt M.[1], Novák Z.[2]**
[1]Institute of Forensic Medicine, Faculty of Medicine Masaryk University and St. Anne's University Hospital, Brno
[2]Clinic od Neurosurgery, Faculty of Medicine Masaryk University and St. Anne's University Hospital, Brno

## Summary

The aim of this paper was to determine if the saloon percussion pistol, considered to be a non-lethal weapon, can in fact be dangerous to life even if the neucranium is hit elsewhere than the so-called "locus minoris resistentiae" areas. In the face of specialist opinion that states that life-threatening or serious injury can occur only after a shot to the sensitive parts of the head (eyes, ears, sinus, nasal and oral cavity), it was experimentally determined on replacement materials that if the gun is loaded with just 100mg of gun powder a 4.5mm calibre bullet always penetrates the cranium. Saloon percussion pistols can be dangerous to life in situations that nobly expected till now.

**Key words:** Gunshot head injury – Ballistics testing – Percussion pistol

## Souhrn

### Účinek salonní perkusní pistole na náhrady lebečních kostí

Cílem práce bylo zjistit, zda salonní perkusní pistole, považovaná za neletální zbraň, může být životu nebezpečná i při zásahu neurokrania v místech, která nejsou považována za „locus minoris resistentiae". Oproti běžně i mezi odborníky známému názoru, že ohrožení života nebo vážná poruchy zdraví může nastat jenom po zásahu citlivých částí hlavy (oko, ucho, nosní a ústní dutina), bylo experimentálně na náhradních materiálech zjištěno, že stačí do zbraně nabít i zlomek běžného množství prachové náplně jako je 100 mg a střela kalibru 4,5 mm naprosto spolehlivě do lebky pronikne. Perkusní salonní pistole, běžně považovaná za neletální zbraň, může být tedy i v situacích, o nichž to nikdo doposud nepředpokládal, životu nebezpečná.

**Klíčová slova:** střelná poranění hlavy – balistické zkoušky – perkusní pistole

*Soud. Lék., 55, 2010, No. 4, p. 54–55*

## INTRODUCTION

So called "home shooting" handguns were developed as safe weapons for use in enclosed spaces. During a season when the weather was miserable and wasn't good enough for going into the open these weapons were used for training and sometimes just for shooting for fun. We come across these percussion guns from the beginning of the 19th century after the invention of the percussion lock [1]; home shooting percussion handguns themselves were popular only for a few subsequent decades. Despite originals and replicas of muzzle-loading firearms being know, and being freely available on the market in accordance with the law of the Czech Republic, home shooting pistols, although also freely available, are quite unknown. The knowledge of home shooting percussion pistols, is in effect, now in the 21st century, quite forgotten. We keep to the main hypothesis that the power of this pistol should be approximately the same as that of the more powerful airgun.

## MATERIAL AND METHODS

We had the possibility to test a Napoleon Le Page cal. 4,5 mm, fy. Chiappa Firearms (Fig. 1) percussion home shooting pistol. In all experiments spherical lead bullets of cal. 4,5 mm were used. In the first part of the experiment (30 shots) only

**Fig. 1. Percussion Pistol Napoleon Le Page cal. 4,5 mm, fy. Chiappa Firearms**

percussion caps made by Dynamite Nobel Germany were used. In the second part (also 30 shots) a minimum (100 mg) of black gunpowder made by Explosia Czech Republic was also added. Polyurethane plate coated with rubber skin (dimension 250 x 250 x 5 mm) was used as imitation skull bone – this material, by the Swiss company Synbone, is designed to enable reproducible repeatable ballistics testing. The plate was shot at an angle of 90° from a distance of 1.0m in all cases.

Patologie 4-10 22.10.2010 11:51 Str. 55
proLékaře.cz | 20.9.2026

## RESULTS

There were no penetrations through the polyurethane plate when shooting with the cap (Fig. 2). However, when shooting with the cap and 100mg of extra gunpowder the polyurethane plate was penetrated in all cases (Fig. 3, 4).

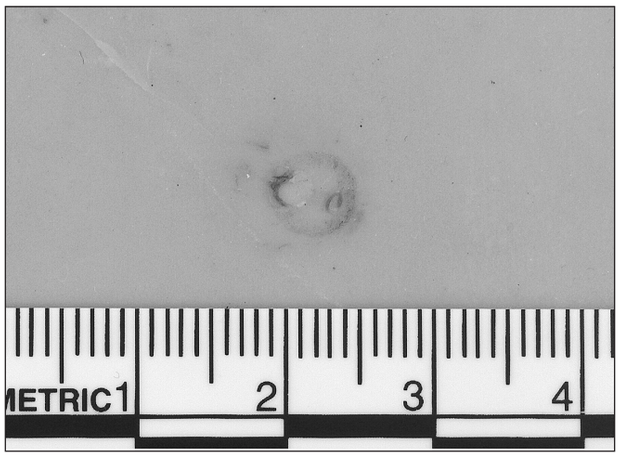


**Fig. 2. Result of shooting with the cap - no penetration through the polyurethane plate**

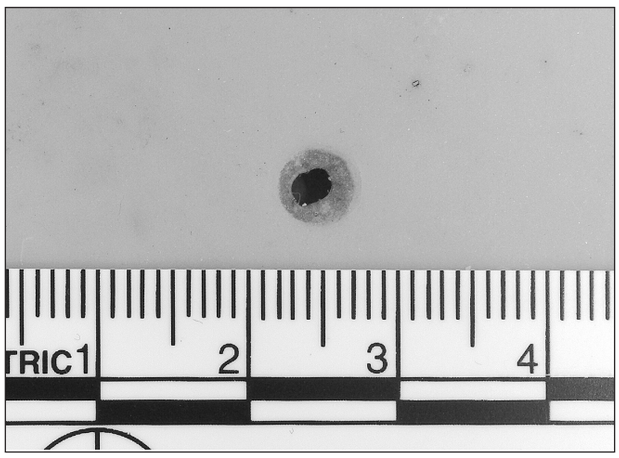


**Fig. 3. Result of shooting with the cap and 100 mg of extra gunpowder – penetration through the polyurethane plate (entry wound)**

## DISCUSSION

Injuries to the brain even by small calibre (.22) bullets are described in literature as lethal in 61% of cases; 85% if death after an initial coma is taken into account [2]. This holds even if the most modern neurosurgery techniques are applied [3]. The efficiency of the home shooting percussion pistol was considered in the profession to be dangerous only in case that the eye, ear, nasal cavity or oral cavity etc. were shot. The aim of this research is to the answer the question: „Can this weapon be called lethal after shooting not only locus minoris resistentiae of the cranium?“ e.g. from the back side through occipital bone. The results of experiments answered there should not be any serious intracranial injury if only the explosive cap is used. But our team proved that if anybody, even if it is by mistake or by wilful act, loads the weapon with a minimum of gunpowder (100 mg) and shoots the brain part of the head (neurocranium), penetration into the cranial cavity is almost certain with all the negative effects. Another serious and a life threatening menace is when the shot penetrates into the abdominal and/or thoracic cavity, or when the greater limbs' vessels or sensitive parts of the neck are injured.

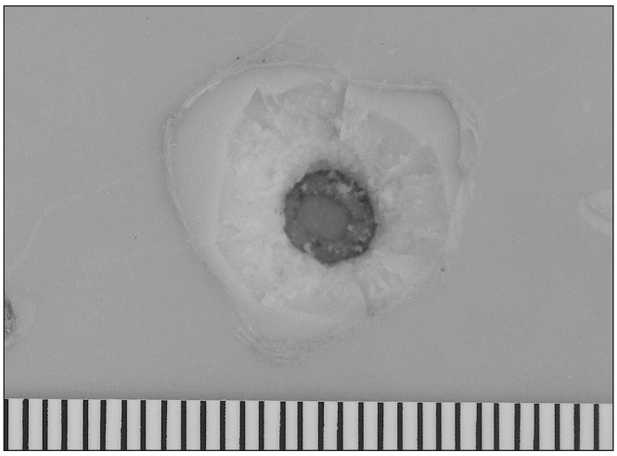

**Fig. 4. Result of shooting with the cap and 100 mg of extra gunpowder – penetration through the polyurethane plate (exit wound)**

**Supported by Research project of the Ministry of Health of the Czech Republic No. NS10411-3/2009.**

## LITERATURE

1. **Sellier K., G., Kneubuehl B., P.:** Wound Ballistic, Elsevier, Amsterdam, 1994.
2. **Suddaby L, Weir B, Forsyth C.:** The management of .22 caliber gunshot wounds of the brain: a review of 49 cases. Can J Neurol Sci. 1987 Aug; 14(3): 268–72.
3. **Chrastina J, Smrčka V, Nádvorník P, Zbořilová E.:** Stereotaxic therapy of posttraumatic cerebral hemorrhage. Rozhl Chir 1996 Jul; 75(7): 330–3.

*Korespondující autor:*
*MUDr. Jan Krajsa, Ph.D.*
*Ústav soudního lékařství*
*Tvrdého 2a*
*662 99 Brno*
*jan.krajsa@fnusa.cz*