

## Basic Concepts and Confusion about Ocular Penetration and Perforation

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In all surgical sciences penetration and perforation are very commonly used words. It is not very clear whether in all branches of surgical sciences they convey the same meaning. Ideally it should convey the same meaning.

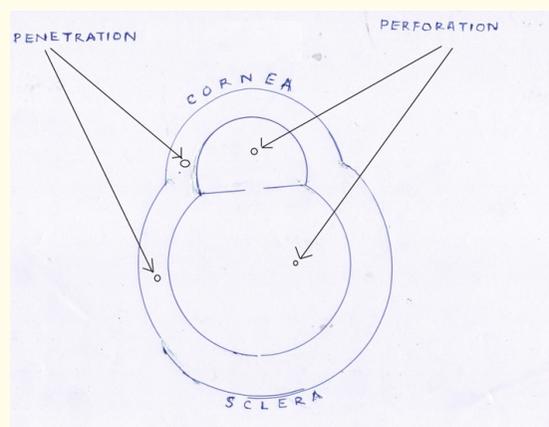
The basic difference is that penetration occurs in a solid structure whereas perforation always occurs in a cystic structure of the body. Taking common example when a thorn pricks the heel it penetrates the skin and muscle in the heel. So also, when you give an intramuscular injection in the arm or thigh you penetrate a muscle. In both cases you do not use the term perforation [1,2].

However, in cystic cavities of the body like gall bladder, stomach, urinary bladder and eye ball we use the term perforation once a sharp object pierces through the walls of the cavity and makes an communication between the cavity and the exterior or another cavity. Thus, a through and through hole formation is an essential feature of perforation. Following these essential features three pathological changes are very likely to occur. Usually the pressure in these cavities is higher than atmospheric pressure.

So, the first change which follows is escape of fluid/gas from the cavity to outside atmosphere or another larger cavity. This naturally leads to lowering of pressure inside the cavity and slight change in the shape as well which is likely to reduce depending on the quantum of loss of fluid. Thus, the features of perforation can be summarized as:

1. Through and through hole formation.
2. Escape of fluid/gas.
3. Reduction of pressure in the cavity.
4. Change in the shape of cavity.

These changes lead to more chances of infection. None of these changes occur in a case of penetration. However, there are a few situations where the walls of the cavity are fairly thick. Earlier description had presumed that the walls of the cavity are very thin and thus of negligible importance.



**Figure 1**

However, if the walls are fairly thick as in eye ball we have a different scenario. In such cases we can have both penetration as well as perforation Not only that in some cases both can occur simultaneously. In a blast injury some particles may lie over the eye ball (extra-ocular), some may just penetrate the cornea or sclera (intra-mural) whereas some can go inside the eye ball piercing cornea or sclera (intra-ocular). In blast injuries there can be combination of all these pathological conditions.

Thus, investigations and management could be from very simple to very complicated. In addition, some foreign bodies are inert and cause mechanical damage, some may carry infection with them inside the eye ball whereas some may excite specific reaction as in cases of iron and copper F.B.

Lastly it has to be kept in mind that these injuries are much commoner in children and young persons who have a long way to go with their education and employment and thus need early care and attention [3].

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