

## Shotgun Research

Dear Readers,

During an opinion leader meeting of a dental company in Scotland, we were taken out for recreational activity. There for the first time in my life, I held a shotgun in my hands. The objective was to learn how to shoot clay pigeons. Like all Swiss men, I was required to serve in the army, so firing a weapon was not new to me. I was trained on an assault gun, where you learn to focus, aim very precisely and without moving, not to lose aim, and to release the trigger. With this technique, I was usually able to hit the bull's-eye. Well, with the shotgun it was quite different. First I had to get used to moving targets, second, once I had understood the principle that you fix the barrel of the shotgun in a constant relation to your eye – keeping it so you could see it completely along its long axis, you then did not move the gun, but the whole body with the gun – it became quite easy, and I only seldom missed a clay pigeon. In contrast to a conventional rifle, where you hit precisely with only one bullet at a time, with the shotgun, you blast a multitude of small shot that cover a cone-shaped space. Therefore, even if your aim is less than perfect, you still have a good chance of hitting something; just shoot into the woods and see what happens.

Being an editor as well as an attendee of large congresses where countless posters are presented, I can't help feeling that this approach is often used for conducting studies when the scientist is not entirely sure where to go with the research question. Dear colleagues, this is the major reason for rejection. Besides the language, faulty "materials and methods" and the lack of a clear "research hypothesis" are the most frequent complaints

of reviewers. The latter two items reflect the true intellectual performance of a scientific paper. You really need to know the field to be able to pin down a research question or hypothesis, based on the known facts and the gaps in knowledge. You have to know your target, then focus on and hit it as precisely as possible. This, of course, presumes profound scientific knowledge of the mechanisms and comprehensive background knowledge on the problem you are dealing with. A negative example along these lines would be to apply all known surface conditioning methods to all ceramics, neglecting the fact that different ceramics require different conditioning and being ignorant of which mechanisms are behind the possible adhesion. Only if the principles are understood is it possible to come up with something new which has a chance for success.

The other sin in research is dealing with moving targets, because this involves changing your experimental conditions while you are still experimenting. This is the best way to confuse yourself and the reviewers: "I did not understand what the authors wanted to do" is a very typical statement leading to rejection.

Therefore, dear authors, think first and think hard before you act. This means being focused and precise; it is the best way to get a hit. Leave the shotgun at home, unless you want to shoot your own pheasant for Christmas dinner.

Sincerely yours,



JF Roulet