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EDITORIAL

Evidence (and research) are the only possible basis of medicine[☆]

La evidencia (y la investigación) son las únicas bases posibles de la medicina

The world of research is rarely well understood by clinicians. Sometimes scepticism prevails over confidence, and personal experience appears to many as a better teacher than scientific literature. The aim of this editorial is to offer clinicians some tools to better understand this “Wizard of Oz” world of research, coming from a clinician who happened to be also a researcher and finally an editor.

Experience: the usual, faulty teacher of physicians

When we are kids we rapidly learn to rely on our experience. At the start our parents, who are our very first teachers, tell us what to do: we do not touch the fire. Then, after a while, we start to explore what is around us and, doing our first personal research, we verify what our parents tell us: we touch the fire, and the subsequent burn clearly tells us what to do, and also teaches us to rely on what we have learned from our own experience, which finally confirms what reliable teachers our parents are. When we become doctors, we follow almost the same path: teachers tell us what to do, then we try, and we “believe” or not, and we “know” because we “believe”.

Unfortunately, what we really learn from our experience as physicians is what drives us to the conclusion that can be seen in some of the eldest among us, mainly the “famous” ones: a megalomaniac delirium of omnipotence. In fact, we continue to see our own successes, but we forget that all our mistakes and/or disasters do not come back to us: they seek help from others. Moreover, we are apparently the only ones able to solve the terrible mistakes that everybody else continuously makes: the reality is that, since we see what

did not work in the hands of others, we can avoid making the same mistakes, hence being able to reach better conclusions than before.

Another factor to be considered in this equation is the “vis sanatrix naturae”, i.e. the tendency of many pathologies to be self-resolving. In this context, being the last link in the chain, the one that receives the patient after everybody else, simply allows time for the disease to complete its own course and resolve itself independently of what we ourselves do (if we are smart enough to avoid doing any harm). This is totally the case with acute low back pain (ALBP), where what each of us does (different from what most of the others do) appears useful, but only because ALBP self-resolves quite rapidly¹: in fact patients, once they have been told what the natural history of the disease is, most of the time prefer doing nothing rather than being treated.²

But, if we discard our experience, what are we to rely on?

Wizards vs physicians

King Charles II (1630–1685) had the best physicians of England at his Court. When he had a stroke on February 2, 1685, he was treated with the best available resources of Medicine of the time. Here is the outstanding succession of treatments he was “awarded”:

- 16 oz of bloodletting
- Imperative sitting, not to sleep
- Glass cupping on the shoulders
- Shoulders’ scarification with another 8 oz of bloodletting
- High doses of emetic and purgative, with repeated clysters
- Head shaven with needle-stuck
- White-hot cautery

The King was lucky enough not to wake up any more, and died in 4 days. This report tells us something about

[☆] De acuerdo con los autores y los editores, este artículo se publica simultáneamente y de forma íntegra en las siguientes publicaciones: Eur J Phys Rehabil Med. 2011;47:189-91 y Rehabilitación (Madr). 2011; 45: 189-91.

the experience- and master-rooted Official Medicine of the time, and its basis. The question is: what makes Official Medicine now different from that available to poor King Charles II, but also from Alternative or Complementary Medicine? It is mainly a problem of methodology, as we will see.

Doctor James Lind, FRSE (1716–1794), was a young physician working for the Royal Navy of His Majesty the King of England. That was the time of scurvy, a real scourge during long voyages in the age of the discovery of the world. Now we know a lot about scurvy, but this was not the case at Lind's time. In 1747 he was in some trouble, since the Royal College of Surgeons (of which he was a member) and the Royal Admiralty (his payer) were engaged in a dispute about what the best treatment was to avoid scurvy, the former suggesting low-dose sulfuric acid, and the latter spoonfuls of vinegar. Lind personally was convinced that help could come through an acid dietary supplement. In the face of this, he decided to check experimentally what the best solution might be: as soon as scurvy began to affect his ship, he divided the sailors into six pairs. They received the same diet, with different supplements for each pair: cider, sulfuric acid, vinegar, seawater, barley water, and two oranges plus one lemon. After 6 days they ran out of fruit, but the two sailors of the last group recovered; all the others remained sick, apart from the first pair receiving cider, who had some advantages from this supplement. This is known as the first controlled trial reported in the history of medicine. Unfortunately, Lind did not completely understand what he had done, and only almost 50 years later, in 1794, was lemon juice experimented again and the Admiralty convinced. This story tells us that a lot of time can pass between a discovery and its everyday application (today some 10–20 years have been reported),³ sometimes because the first developer is too blinded by his own ideas to believe what he has found. But, most of all, it tells us about the importance of the scientific method, on which Official Medicine decided to rely. And this gives, in my view, the only real difference between Official and Alternative/Complementary Medicine: when the latter undergoes the same methodological path as the first, it can (and should) be considered on the same level and under the same term of "Official". This is the case of acupuncture in some respects,⁴ and of osteopathy or chiropractic when we speak of the manipulative act, but not when we refer to their theories or other practices.^{5,6} Apparently, this is not the case, until now, with Homeopathy.⁷

The "New Era" of medicine we are building

I was given the opportunity some years ago to see the first paper demonstrating scientifically the correlation between disk herniations and sciatica, and stressing the importance of the surgical approach, by Mixter and Barr⁸: it had been published in the *New England Journal of Medicine* back in 1934 on 16 patients only, and the methods section was full of calculations, with some very simple statistics, such as standard deviation, or correlation. This not only explains why there were only 16 patients (too hard to include more), but also tells us (due to this reduced sample for a premise at the base of many therapeutic behaviors) how low reliability is with regard to a lot of the old theories of medicine, even

if gathered through research. In the meantime, it led me to understand that we are now building something new in terms of research, only since the late 70s and the 80s. The spread of personal computers has brought about the incredible increase of science in Medicine we have seen in recent years.⁹ Now it is possible to gather evidence from thousands of patients with just a few minutes of calculations. It is only a question of good methods and not of mathematical abilities. We are finally reaching some good and reliable conclusions on which we can really base our practice today, and on which future researchers will be able to build new insights and knowledge.

In the Middle Ages mankind experienced an apparent period of standstill in growth: there was a philosophical background for this. People in fact used to think of themselves as midgets on the shoulders of giants, i.e. the Romans and Greeks who had been able to develop knowledge and science and philosophy to what was thought to be the maximum possible. Everything changed with the Renaissance, when the scientific method was developed, and gradually the progress begun. The same has now been underway for some decades in the humanistic science of Medicine, where we have now stopped relying solely on the unstable shoulders of our giant masters, but we can build future knowledge from the sound foundations of the present.

Future help to defend us from false scientists

Obviously not everything is good by definition, just because we call it research and science. The problem is that distinguishing the wheat from the chaff is not easy if one is not trained well enough to avoid the traps laid by bad masters and bad researchers. This is the reason why, in future issues, the European Journal of Physical and Rehabilitation Medicine (EJPRM) will develop a Thematic Series on Clinical Epidemiology for Rehabilitation Specialists, to give readers and clinicians the tools to better understand what they read in the EJPRM and in all the other journals in the field. On the same line, our editorials will aim to open the door to a greater understanding of research, and offer our readers the tools to prevent them from false scientists.

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