

## EDITORIAL

### Over time, evidence changes

#### Misinformation and a believability crisis

The recent COVID-19 pandemic unleashed an “infodemic”, which is an abundant and uncontrolled spread of potentially harmful misinformation.<sup>1</sup> The prevalence and the inability to fact check the misinformation was likely the cause of a worldwide vaccination hesitancy. As an international authorship team of a recent publication in the *Brazilian Journal of Physical Therapy*,<sup>2</sup> we have experienced a similar misinformation proliferation in physical therapy. This motivated us to investigate clinicians’ beliefs regarding common physical therapy interventions and found there was moderate and strong disbeliefs in the information associated with manual therapy and modalities.<sup>2</sup> We hypothesized that the primary reason for the moderate and strong disbelief was the prevalence of misinformation.

Indeed, misinformation is widespread in published papers and in social media.<sup>2,3</sup> There are increasing numbers of publication retractions, replication failures, biased results from corporate-sponsored studies, spin, omission of important information, and dropping of unsupported hypotheses.<sup>2</sup> Social media influencers commonly embrace misinformation regarding interventions in which they have a bias for (or against), or those in which they have a stake (i.e., continuing education courses).<sup>3</sup> Because an increasing number of physical therapists are acquiring their information from efficient, online sources,<sup>4,5</sup> this can lead to a believability crisis.

#### To blame misinformation solely for a believability crisis is misinformation

Misinformation is only one of the causes of belief concerns; changing information is another. Physical therapy is an applied science and applied sciences (e.g., medicine, diet and nutrition, chiropractic) update/modify their approaches over time as new information is gathered.<sup>6</sup> For example, diet and nutrition has exhibited wholesale changes in their evidence-based recommendations over a 100-year history.<sup>7</sup> David Sackett once famously said; “Half of what you’ll learn in medical school will be shown to be either dead wrong or

out of date within five years of your graduation; the trouble is that nobody can tell you which half”.<sup>8</sup> The truth is, we have seen recent examples of time-related changes in the literature, including the aforementioned manual therapy and modalities literature.

A 2022 systematic review and meta-analysis, which included 91 randomized controlled trials, found that pain intensity was lower during or immediately after strong but comfortable TENS, when compared with placebo, standard of care, or no treatment.<sup>9</sup> The study included a number of clinical conditions (including back pain) and suggested mostly large clinical effects.<sup>9</sup> This recommendation is markedly different from a 2018 study that included 12 randomized controlled trials, which suggested that TENS does not improve symptoms of back pain when compared to controls (i.e., sham control, placebo, or medication only).<sup>10</sup> For acute low back pain, a meta-analysis published in JAMA showed that spinal manipulation was associated with modest improvements in pain and function.<sup>11</sup> A Cochrane review just 4 years prior reported; “spinal manipulative therapy is no more effective for acute low back pain than inert interventions, sham manipulative therapy, or as adjunct therapy”.<sup>12</sup>

#### How do we address changes related to time?

The fluidity of evidence over time may be a challenge to some individuals but a few successful strategies will allow clinicians to adapt to conflicts. First, recognize that the Proteus Phenomenon is real. The Proteus Phenomenon is the tendency of subsequent publications to contradict early research works. Early publications typically demonstrate greater effects,<sup>13</sup> but these are commonly associated with publication bias, which diminishes with subsequent studies. Second, expect changes in evidence to occur over time. Differences in populations studied, methods, outcomes, and objectives will lead to differences in results. Third, understand that extreme findings are extremely rare. One may see changes over time but dramatic, extreme changes are not that common; changes are more likely to be subtle. Fourth, be flexible and remain an adaptive learner. Do your own homework and see if the research fits the care environment you currently work within and whether the patient population is similar to yours. If it fits, it may be relevant. If it does not, it may not.

## Conflicts of interest

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