Editorial

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Eponymous laws of ultrasound

Ahmad J. Abdulsalam

Department of Physical Medicine and Rehabilitation, Mubarak Al-Kabeer Hospital, Jabriya, Kuwait

Physicians value laws like Starling's, Wolff's, and Hilton's. Yet, some of the laws that mostly govern our clinical practice are not found in textbooks, but in popular philosophy! These everyday maxims feel authoritative because they compress hard-won experience into a single, memorable sentence, much as our biomedical eponyms do. Herein, we "re"-present six such laws from a musculoskeletal ultrasound (US) point of view and argue that they have been quietly imposing on our US practice all along (Table I).

Murphy's Law reminds us that what can go wrong, will go wrong, and usually on the day it matters most. In musculoskeletal US, if a structure can be missed, it will be missed: the lesion sits at the edge of the field of view, the tendon fades into anisotropy as we tilt the probe, or the small effusion is overlooked because we did not sweep far enough proximally. The remedy is a standardized, reproducible scan that interrogates every relevant structure in the same order every time. This is exactly why systematic approaches such as the EURO-MUSCULUS/USPRM basic scanning protocols were developed, so that no anatomical structure escapes our transducer [1].

Kidlin's Law states that a problem written down clearly is already half solved. In our field, the clinical question is the scan. US is not a fishing expedition across the limb but a focused conversation between a well-framed question and the probe. A vague request to "rule out pathology" yields a vague examination, whereas a precise pre-scan question (Is the supraspinatus torn? Is the median nerve enlarged at the carpal tunnel?) narrows the differential diagnoses, dictates the windows we obtain, and sharpens the diagnostic process [2]. Without the history and physical examination to guide it, even a flawless scan can mislead.

Sutton's Law takes its name from the bank robber who, asked why he robbed banks, reputedly answered, "Because that is where the money is." Translated to medicine, it tells us to go straight to where the diagnosis is most likely to be found, and few tools honor it as well as US. At the bedside and in real time, the probe can be placed directly over the point of maximal tenderness, on the very structure the patient is pointing to, often answering the question within minutes and without ionizing radiation. When intervention is warranted, the same window guides the needle to its target [3].

Gilbert's Law holds that your success is in your hands, and for sonographers, that is quite literal. Unlike a static radiograph or a pre-acquired cross-sectional study, the US image is created in real time by the person holding the probe, so its quality is directly proportional to the examiner's skill, knowledge, and hands-on experience. As Naredo et al. showed, interobserver reliability in US depends heavily on training and standardization of technique [4]. This operator dependence is often called the modality's chief weakness, yet it is also its strength, since a skilled examiner can compare sides and scan dynamically in ways no fixed image allows. No algorithm can yet replace the trained hand that maneuvers in real time.

Wilson's Law urges us to prioritize knowledge. In US, this means anatomy, anatomy, and more anatomy. The transducer shows only a thin tomographic slice, which is meaningless to an examiner who cannot picture what lies above, below, and beside it. Without a firm command of cross-sectional and dynamic sonoanatomy, including the normal variants and the artifacts that mimic disease, even the highest-resolution transducer yields little more than being lost in gray-scale. The most valuable upgrade in any US service is therefore rarely a newer machine; it is education [5].

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Corresponding author: Ahmad J. Abdulsalam, MD
Department of
Physical Medicine and Rehabilitation,
Mubarak Al-Kabeer Hospital
Jabriya, Kuwait
E-mail: dr.ahmad.j.abdulsalam@gmail.com

Table I. The six eponymous laws and their application to musculoskeletal ultrasound (US).

Eponymous law	Popular Proverb	Application to musculoskeletal US
Murphy's Law	What can go wrong, will go wrong.	Follow standardized scanning protocols so that no structure is missed [1].
Kidlin's Law	A problem clearly written down is half solved.	Frame a precise clinical question before scanning; the question shapes the examination [2].
Sutton's Law	Go where the money is.	Scan directly at the point of maximal tenderness; targeted, point-of-care imaging and needle guidance [3].
Gilbert's Law	Your success is in your hands.	Examination quality mirrors the operator's skill; invest in training and standardization [4].
Wilson's Law	Put knowledge first.	Master cross-sectional and dynamic sonoanatomy, including normal variants and artifacts [5].
Falkland's Law	If a decision is not necessary, do not make it.	Do not needle every incidental finding; treat patients, not images [6].

Falkland's Law advises that if a decision is not necessary, do not make it. This is perhaps the most underappreciated law in interventional ultrasonography. The very sensitivity that makes US so powerful also reveals many incidental findings, such as small effusions, asymptomatic tears, and age-related tendon changes, that are common in pain-free people and may have nothing to do with the complaint. Not every incidental finding warrants a needle, and not every effusion demands aspiration. We should think twice before every intervention; in the end, we do not want to treat images but patients [6].

Collectively, these six laws remind us that musculoskeletal US is not simply a technical skill learned in a few courses; it draws on protocol, clinical reasoning, anatomy, manual craft, and judgment in equal measure. Murphy asks for rigor, Kidlin for a clear question, Sutton for aim, Gilbert for skill, Wilson for knowledge, and Falkland for restraint. The best law any ultrasonographer can follow may be the simplest: know when to scan, know what to find, and know when to say no to the needle!

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