

## Letters

# The “Tremor Diary”: A Useful Tool in the Management of Patients with Tremor

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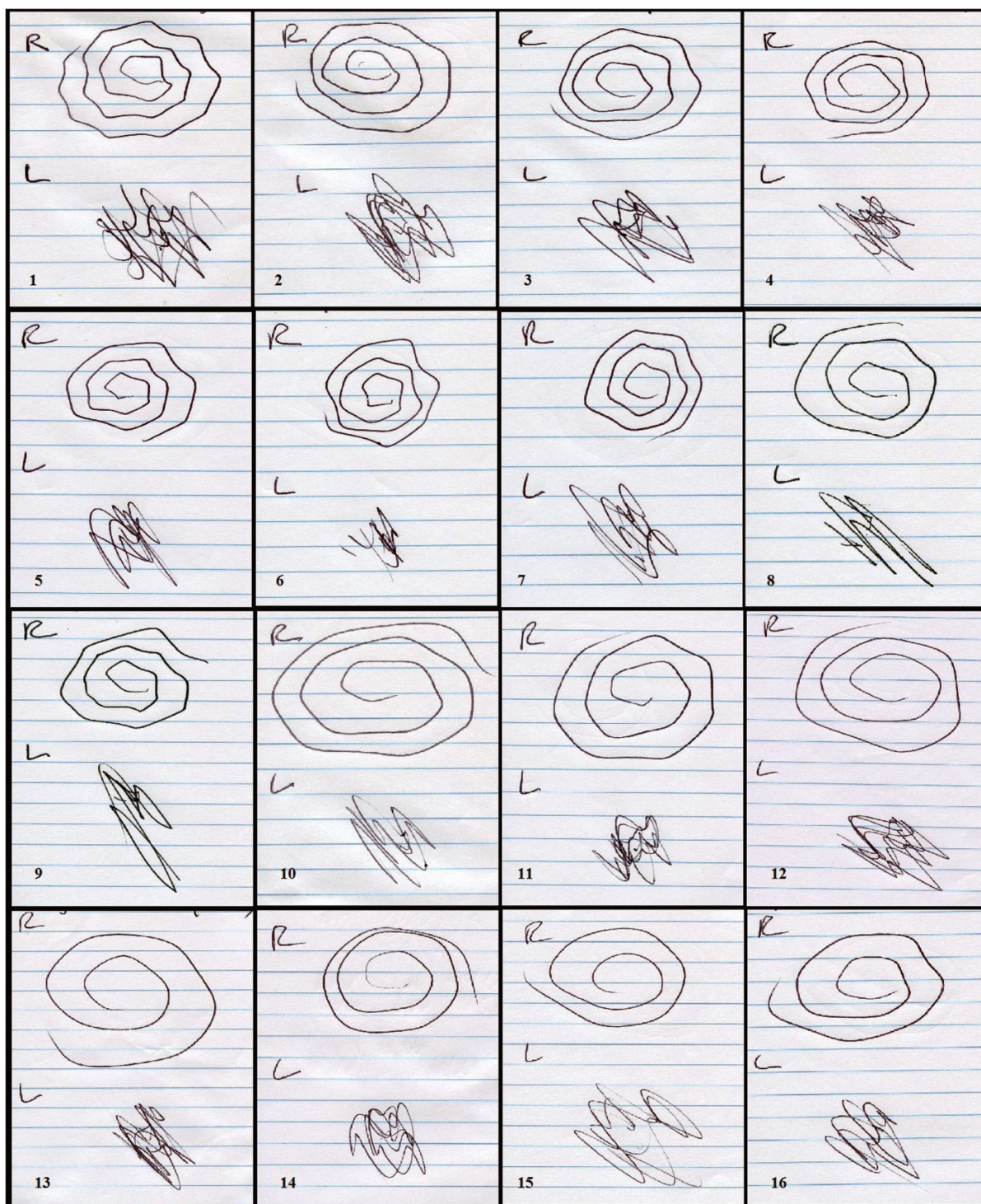
## Introduction

When caring for patients with essential tremor (ET) and other action tremors in the outpatient setting, a challenge for the clinician is to assess interval changes in tremor severity, particularly if such changes are subtle. Patients are often asked to report whether their tremor has worsened between visits or whether they have experienced an improvement in the setting of a therapeutic challenge with a new medication or an increase in dosage of an existing medication. Conversely, patients may be asked to report whether their tremor has worsened in the setting of a reduction in dosage. In these various settings, patients often have difficulty assessing whether their tremor has changed or improved, and this is made more challenging by the presence of normal day-to-day fluctuations in tremor severity that patients often experience. The patient’s level of anxiety or mood may further affect their ability to objectively assess the severity of their tremor. The tremor on the day of their clinical visit may be influenced by their psychological state or level of fatigue, confounding the neurological examination. In addition, “white coat syndrome” might influence the amount of tremor observed in the office.

For several years, one of us (E.D.L.) has used a simple clinical aid to help assess response to medication change. To our knowledge, this method has not been published elsewhere. The goal of this brief report is to share this method with the larger community of movement disorder neurologists and discuss its benefits.

## Methods

The approach is as follows. E.D.L. asks the patient to purchase a notebook and draw one Archimedes spiral with each hand at the same time of day. It is preferable to draw at least five complete turns. In general, daily spirals are difficult to achieve, so spirals drawn on even or odd days (i.e., alternate days) is suggested. The spirals should be drawn in the same way each time, preferably without resting the hand on the table. Pen is preferred. The patient is then instructed to bring their notebook to their follow-up appointment so that the evolution of their spirals can be assessed. The tremor in these spirals can be rated using an objective spiral rating scale such as the 0–10-point scale published by Bain and Findley.<sup>1,2</sup>



**Figure 1. Sixteen Spirals Drawn by the Illustrative Patient.** The patient was on an escalating dose of primidone, beginning with day 1 (spiral 1, prior to initiation of primidone) and continuing to day 80 (spiral 16, five days on 300 mg/day).

## Results

In this report, we provide an illustrative example. The patient was placed on primidone, with doses increasing by 25-mg increments approximately every week to a target of 300 mg/day, attained on day 75. One will see that the spiral drawn with the right hand improved from a Bain and Findley rating of 4–5 (spiral 1) to a rating of 1 (spirals 15 and 16) (Figure 1). Tremor on the left diminished, although to a lesser degree and, due to ceiling effects, stayed at a Bain and Findley rating of 9. One will see that improvement does not seem to be strictly linear.

To demonstrate that the difference across visits was readily visible, and was not influenced by the fact that the rater knew the order/temporal placement of the spirals in the diary, we scanned the spirals into an electronic format and randomized them using a random digit table. Two neurologists blindly and independently ranked the order from most to least severe tremor. The severity rankings of the senior neurologist (E.D.L.) correlated to a significant degree with the order (date) of the spirals (Pearson's  $r=0.78$ ,  $p<0.001$ ). The junior movement disorder neurologist's rankings were similar to those of the senior neurologist (Pearson's  $r=0.49$ ,  $p=0.05$ ).

## Discussion

The tremor diary appears to be a valid objective measure that various raters can assess. Although less precise than motion sensors,<sup>3</sup> and subject to ceiling effects, the tremor diary is easily administered and does not require any electronic equipment. We believe this method is useful for a number of reasons. It is a method that provides a simple, easily visualized measure of tremor severity. With slow medication titrations, spirals could even be drawn less frequently than on alternate days (e.g., once or twice weekly). By completing the spirals, patients can obtain regular feedback as to their clinical state. The exercise keeps them engaged in their treatment, giving them "homework" in between appointments. The spirals themselves provide objective information, and they may become a focal point for discussion with the clinician at each visit. Finally, the tremor diary serves as an objective measure of tremor severity that can be reliably rated by clinicians.

## References

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