OPEN ACCESS Freely available online

Tremor and Other Hyperkinetic Movements

Reviews

The Top 50 Most-Cited Articles in Orthostatic Tremor: A Bibliometric Review

Moisés León Ruiz[1*†] & Julián Benito-León[2,3,4†]

[1]Department of Neurology, Clínica San Vicente, Madrid, Spain, ES, [2]Department of Neurology, Hospital Universitario 12 de Octubre, Madrid, ES, [3]Department of Medicine, Faculty of Medicine, Universidad Complutense de Madrid, Madrid, ES, [4]Centro de Investigación Biomédica en Red sobre Enfermedades Neurodegenerativas (CIBERNED), Madrid, ES

Abstract

Background: Article-level citation count is a hallmark indicating scientific impact. We aimed to pinpoint and evaluate the top 50 most-cited articles in orthostatic tremor (OT).

Methods: The ISI Web of Knowledge database and 2017 Journal Citation Report Science Edition were used to retrieve the 50 top-cited OT articles published from 1984 to April 2019. Information was collected by the Analyze Tool on the Web of Science, including number of citations, publication title, journal name, publication year, and country and institution of origin. Supplementary analyses were undertaken to clarify authorship, study design, level of evidence, and category.

Results: Up to 66% of manuscripts were recovered from five journals: *Movement Disorders* (n = 18), *Brain* (n = 4), *Journal of Clinical Neurophysiology* (n = 4), *Neurology* (n = 4), and *Clinical Neurophysiology* (n = 3). Articles were published between 1984 and 2018, with expert opinion as the predominant design (n = 22) and review as category (n = 17). Most articles had level 5 evidence (n = 26). According to their countries of origin, 34% of articles belonged to the United States (n = 17) leading the list, followed by United Kingdom (n = 15). University College London yielded the greater number of articles (n = 12), followed by the University of Kiel (n = 9). Most popular authors were G. Deuschl (n = 10), C.D. Marsden (n = 6), J. Jankovic (n = 5), P.D. Thompson (n = 5), J.C. Rothwell (n = 5), L.J. Findley (n = 4), and P. Brown (n = 4), who together accounted for 48% of them. All papers were in English.

Discussion: Publishing high-cited OT articles could be facilitated by source journal, study design, category, publication language, and country and institution of origin.

Keywords: Articles, bibliometrics, citation analysis, impact, orthostatic tremor, top-cited

Citation: León Ruiz M, Benito-León J. The top 50 most-cited articles in orthostatic tremor: A bibliometric review. Tremor Other Hyperkinet Mov. 2019; 9. doi: 10.7916/tohm.v0.679

*To whom correspondence should be addressed: E-mail: pistolpete271285@hotmail.com

†M.L.R. and J.B-L. were both responsible for the conception, design, organization, and execution of the research project and manuscript. M.L.R. wrote the first draft of the manuscript.

Editor: Ruth Helen Walker, Mount Sinai School of Medicine, USA

Received: May 9, 2019 **Accepted:** July 6, 2019 **Published:** August 5, 2019

Funding: Dr. León Ruiz has nothing to disclose. Dr. Benito-León is supported by the National Institutes of Health, Bethesda, MD, USA (NINDS #R01 NS39422), the Commission of the European Union (grant ICT-2011-287739, NeuroTREMOR), the Ministry of Economy and Competitiveness (grant RTC-2015-3967-1, NetMD-platform for the tracking of movement disorder), and the Spanish Health Research Agency (grant FIS PI12/01602 and grant FIS PI16/00451).

Financial disclosures: None.

Conflict of interest: The authors report no conflict of interest.

Ethics statement: Not applicable for this review.

Introduction

Bibliometrics is a statistical analysis of books, articles, and/or other publications. Bibliometric analysis use data on numbers and authors of scientific publications and on articles and the citations therein, and in patents, to evaluate the output of individuals/research teams, institutions, and/or countries; to identify national and international networks; and to delineate the development of novel multidisciplinary areas of science and technology.[1]

One method to estimate the academic relevance of an article is the rate at which the work is cited by other authors. When an article is referenced by another peer-reviewed article receives a "citation".[2] The number of times an article is quoted in scientific journals translates its impact on a specific biomedical field or specialty, and indicates the impact of the authors' creativity.[3–5] The Institute for Scientific Information (ISI) has been collecting citation and other academic impact information since 1945, and it has been available electronically since 1979. ISI (currently a subsidiary of Thomson Corp.) calls their newest journal citation system "Science Citation Index Expanded (SCIE)", and it is one of the databases accessible under the banner of Web of Science.[2,6,7] Citation data from peer-reviewed articles are indexed from more than 10,000 high-impact journals not only in the sciences and social sciences, but also in the arts and humanities.[2,8]

In the last few years, several citation studies of the top-cited articles have been carried out in different areas of clinical neurology and neurosurgery, such as essential tremor (ET),[2,9,10] dystonia,[10] Parkinson's disease (PD),[11] epilepsy,[12] multiple sclerosis,[13] brain metastases research,[14] and neurosurgery.[15–20] Nevertheless, no similar study has been conducted in the context of orthostatic tremor (OT). OT, also called "shaky leg syndrome",[8] is an uncommon neurological disease that was first coined by Heilman.[21] It has an undetermined prevalence and incidence, and is typically distinguished by unsteadiness along with a uniquely coherent 13–18 Hz postural tremor of the leg, trunk and, less frequently, arm, neck and cranial muscles, while standing, and subsiding on movement or sitting. It constitutes one of the most unusual and enigmatic tremor syndromes, which is thought to be generated from so far not exactly known central oscillator located at the brainstem and/or cerebellum, without ruling out the possible involvement of ponto-cerebello-thalamo-cortical pathway, fronto-cerebellar loops, motor and sensory cortices, and the basal ganglia.[8,22–34] Hence, more studies are warranted to shed light on the epidemiology and etiopathogenesis of this potentially disabling movement disorder.

Recent years have seen an exponential increase in the number of scientific publications on OT, mainly distributed through the fields of epidemiology, pathophysiology, clinical phenomenology, diagnostic tools, and treatment options.[8,22–52]

We used the electronic version of the SCIE to determine which published OT articles have been most usually cited by other authors, ranking the 50 top-cited works. By analyzing the characteristics of these articles, we tried to provide a comprehensive review, identifying the most highly cited articles in OT research, including primary OT and OT plus, and determining what properties make these articles relevant for further studies and clinical practices.

Methods

A search was performed through the bibliometric database Web of Science for articles using the topic search term "orthostatic tremor*" (the asterisk was included as a wild card character). In early April 2019 (April 6, 2019), we found the 50 top-cited OT articles (Table 1) published in professional journals between 1900 and 2019 by the Web of Science. The full texts were mainly picked by PubMed, ScienceDirect, and ClinicalKey.

The search term for OT returned 508 articles with the earliest published in 1984.[21] The results were separately sorted by number of citations from highest to lowest and were manually examined to identify the top 50 cited articles related to the topic. Works were regarded as "citation classics" if they received 400 or more citations.[53–55] Key data regarding country of origin (based on the first author's affiliation), institution, year of publication, publication name, and citations of the target articles were obtained from Web of Science using the Analyze Tool. Further analyses were then performed to ascertain authorship, article type, study design, and level of evidence. For each study, the level of evidence was graded according to the Oxford Centre for Evidence-Based Medicine (OCEBM) Levels of Evidence (2011).[56,57]

Cited half-life is defined as the number of publication years, going back from the current year, that account for 50% of current citations received. This index helps to evaluate the age of the majority of cited articles published in a journal. Only those journals cited 100 or more times have a cited half-life.[6] On the other hand, the h-index aims to measure the cumulative impact of a researcher's output; the value of h is equal to the number of papers (n) that have n or more citations.[58]

Results

The 50 top-cited OT articles (Table 1) were published in 18 journals. Journal title, number of articles, impact factor 2017, 5-year impact factor, and cited half-life are detailed in Table 2. Sixty-six per cent of articles were recovered from five journals: *Movement Disorders* (n = 18),[22,59–75] *Brain* (n = 4),[76–79] *Journal of Clinical Neurophysiology* (n = 4),[80–83] *Neurology* (n = 4),[84–87] and *Clinical Neurophysiology* (n = 3).[88–90] The 50 top-cited articles on OT were published from 1984[21] to 2018[22] (Figure 1A). The largest number of top-cited articles (n = 25) were published between 1996 and 2002,[59–63,65–67,70,76,78–85,87,89,91–95] and eight of the top 10-cited articles were published in the 1990s (n = 4)[59,77,80,81] and the 2000s (n = 5)[60,76,78,88,91] (Table 1 and Figure 1A).

Twenty-eight authors contributed to design two or more articles to the list, and seven authors contributed to four or more articles (Table 3). The number of authors per article varied from one[21,23,62,66,80,82–84,93] to 28,[59] being the most usual figures one (nine articles),[21,23,62,66,80,82–84,93] two (nine articles),[63,68,69,73,76,96–99] four (eight articles),[78,81,85,88,91,94,100,101] and three (six articles).[61,67,70,72,79,86] The most common authors of the top-cited articles in OT were G. Deuschl (n = 10),[22,59–61,63,69,81,89,91,92] C.D. Marsden (n = 6),[59,76,77,95,102,103] J. Jankovic (n = 5),[59,62,65,68,84] P.D. Thompson (n = 5),[59,77,85,102,103] J.C. Rothwell (n = 5),[59,64,77,102,103] L.J. Findley (n = 4),[59,77,82,103] and P. Brown (4),[64,94,95,104] and when combined, they accounted for 48% (n = 24) of the articles on the list[22,59–65,68,69,76,77,81,82,84,85,89,91,92,94,95,102–104] (Table 3).

According to first author's affiliation, 34% of articles were produced in the United States of America (USA) (n = 17),[21,23,62,65–69,71,72,80,84,86,89,93,97,99] leading the list, closely followed by the United Kingdom (n = 15),[22,64,76–79,82,85,94–96,100,102–104] (Table 1). The next most productive country was Germany (n = 10),[59–61,63,69,81,89,90,91,92] followed by Italy (n = 3).[83,98,101] Spain,[75,87] the Netherlands,[88,105] and Austria,[64,96] each aided two articles, and Argentina,[73] France,[74] Sweden,[99] and Taiwan,[70] each contributed one article to the list (Table 1). The 28 leading institutions that provided

Table 1. **The 50 top-cited OT articles (ranked by number of citations)**

Absolute number	Rank	Paper	Number of citations	Country of origin (based on first author's affiliation)	Number of authors	Study design	Category
1	1	Deuschl et al.[59]	1,206	Germany	28	Expert opinion	Clinical: Classification
2	2	McAuley and Marsden[76]	284	UK	2	Expert opinion	Review
3	3	Deuschl et al.[91]	263	Germany	4	Expert opinion	Review
4	4	Bain et al.[77]	262	UK	7	Case series	Epidemiology
5	5	Elble[80]	193	USA	1	Expert opinion	Review
6	6	Visser et al.[88]	184	The Netherlands	4	Expert opinion	Review
7	7	Heilman[21]	174	USA	1	Case series	Clinical: Classification
8	8	Alusi et al.[78]	144	UK	4	Case series	Epidemiology
9	9	Deuschl et al.[81]	134	Germany	4	Expert opinion	Review
10	10	Raethjen et al.[60]	116	Germany	6	Case series	Laboratory: Pathophysiology
11	11	Wilms et al.[61]	115	Germany	3	Expert opinion	Review
12	12	Jankovic[84]	108	USA	1	Expert opinion	Clinical: Classification
13	13	Deuschl and Bergman[63]	107	Germany	2	Expert opinion	Review
14	14	Thompson et al.[102]	98	UK	7	Case report	Laboratory: Pathophysiology
15	15	Katzenschlager and Lees[96]	97	UK and Austria	2	Expert Opinion	Review
16	16a	Gerschlager et al.[64]	89	UK and Austria	8	Case series	Epidemiology
17	16b	McManis and Sharbrough[97]	89	USA	2	Case series	Clinical: Classification
18	17a	Ondo et al.[65]	84	USA	5	Randomized controlled trial	Clinical: Medical therapies
19	17b	Britton et al.[103]	84	UK	7	Case series	Clinical: Classification
20	18	Jankovic[84]	81	USA	1	Expert opinion	Clinical: Classification
21	19	Wills et al.[85]	72	UK	4	Case series	Laboratory: Pathophysiology
22	20a	Hallett[66]	69	USA	1	Expert opinion	Review
23	20b	Findley[82]	69	UK	1	Expert opinion	Review
24	21a	Abdo et al.[105]	67	The Netherlands	5	Expert opinion	Review
25	21b	Cantello[83]	67	Italy	1	Expert opinion	Review
26	22	Köster et al.[92]	61	Germany	7	Case series	Laboratory: Pathophysiology
27	23	Chouinard et al.[67]	58	USA	3	Expert opinion	Epidemiology
28	24	Wang et al.[100]	56	UK	4	Case report	Laboratory: Pathophysiology
29	25	Lauk et al.[89]	55	Germany and USA	6	Case series	Laboratory: Pathophysiology
30	26a	Nardone and Schieppati[98]	54	Italy	2	Expert opinion	Review
31	26b	Sethi[93]	54	USA	1	Expert opinion	Review

Table 1 continued

Table 1. (*Continued*) **The 50 top-cited OT articles (ranked by number of citations)**

Absolute number	Rank	Paper	Number of citations	Country of origin (based on first author's affiliation)	Number of authors	Study design	Category
32	27a	Katzenschlager et al.[104]	51	UK	11	Case-control study	Laboratory: Pathophysiology
33	27b	FitzGerald and Jankovic[68]	51	USA	2	Case series	Clinical: Classification
34	28a	Bhatia et al.[22]	50	UK	18	Expert opinion	Clinical: Classification
35	28b	Elble and Deuschl[69]	50	USA and Germany	2	Expert opinion	Review
36	28c	Wu et al.[70]	50	Taiwan	3	Case series	Laboratory: Pathophysiology
37	29	Wee et al.[86]	48	USA	3	Case series	Clinical: Classification
38	30a	Espay et al.[71]	47	USA	14	Case series	Clinical: Surgical therapies
39	30b	Piboolnurak et al.[72]	47	USA	3	Case series	Clinical: Classification
40	31a	Papa and Gershanik[73]	46	Argentina	2	Case series	Clinical: Classification
41	31b	Martinelli et al.[101]	46	Italy	4	Case series	Epidemiology
42	32a	Elble[23]	45	USA	1	Expert opinion	Review
43	32b	Semenescu et al.[74]	45	France	8	Case series	Clinical: Classification
44	32c	Benito-León et al.[87]	45	Spain	6	Case series	Clinical: Classification
45	33	Guridi et al.[75]	43	Spain	9	Case report	Clinical: Surgical therapies
46	34a	Fung et al.[79]	40	UK	3	Case series	Laboratory: Pathophysiology
47	34b	Yarrow et al.[94]	40	UK	4	Case series	Laboratory: Pathophysiology
48	35a	Puschmann and Wszolek[99]	39	USA and Sweden	2	Expert opinion	Review
49	35b	Krafczyk et al.[90]	39	Germany	5	Case-control study	Clinical: Classification
50	35c	Wills et al.[95]	39	UK	5	Case report	Clinical: Medical therapies

UK: United Kingdom; USA: United States of America.

the 50 top-cited OT articles are sorted in Table 4. University College London in the United Kingdom originated the highest number of top-cited OT articles (n = 12),[22,64,76,77,79,85,94–97,103,104] followed by the University of Kiel in Germany (n = 8)[59–61,63,69,81,89,91] and Baylor College of Medicine in USA (n = 4).[62,65,68,84]

Among the 50 top-cited OT articles, the most prevalent design was expert opinion (n = 22),[22,23,59,61–63,66,67,69,76,80–84,88,91,93,96,98,99,105] and the next most frequent design was case series (n = 21),[21,60,64,68,70–74,77–79,85–87,89,92,94,97,101,103] and case-control study (n = 2)[90,104] (Table 1). Only one article was a randomized controlled trial (RCT)[65] (Table 1). According to the OCEBM (2011),[56,57] and in line with the study design, the most common level of evidence was that of a level 5 study, including expert opinion (n = 22)[22,23,59,61–63,66,67,69,76,80–84,88,91,93,96,98,99,105] and case report (n = 4)[75,95,100,102] studies, followed by level 4 with case series with or without intervention (n = 21),[21,60,64,68,70–74,77–79,85–87,89,92,94,97,101,103] level 3 with case-control study (n = 2),[90,104] and finally level 1 with high-quality, properly powered and conducted RCT (n = 1)[65] (Table 5). All the 50 top-cited OT manuscripts were written in English.

For following analysis of the most-cited articles, each paper was classified into one of seven categories: epidemiology, clinical classification, laboratory pathophysiology, clinical medical therapies, clinical surgical therapies, and review articles. The number of articles in each category is shown in Figure 1B.

Epidemiology

Studies were incorporated in this category if they described the OT epidemiology such as prevalence, incidence, benchmarks, and trends over time. There were five articles in this category. One study

Table 2. **Journals that published the 50 top-cited OT articles (ranked by number of articles)**

Absolute number	Rank	Journal	Number of articles	Impact factor 2017	5-year impact factor	Cited half-life
1	1	*Movement Disorders*	18	8,324	7,523	7,7
2	2a	*Brain*	4	10,84	11,199	9,7
3	2b	*Journal of Clinical Neurophysiology*	4	1,982	1,813	>10
4	2c	*Neurology*	4	7,609	8,515	>10
5	3	*Clinical Neurophysiology*	3	3,614	3,638	9,6
6	4a	*Annals of Neurology*	2	10,244	10,744	>10
7	4b	*Archives of Neurology (currently known as JAMA Neurology)*	2	11,46	10,415	2,9
8	4c	*Current Opinion in Neurology*	2	401	4,427	7,3
9	4d	*Muscle & Nerve*	2	2,496	2,494	>10
10	5a	*Acta Neurologica Scandinavica*	1	3,126	2,877	>10
11	5b	*European Journal of Physical and Rehabilitation Medicine*	1	2,208	228	4,7
12	5c	*Gait & Posture*	1	2,273	2,971	8
13	5d	*Journal of Neurology*	1	3,783	3,805	7,5
14	5e	*Journal of Neurology Neurosurgery and Psychiatry*	1	7,144	6,923	>10
15	5f	*Journal of Neuroscience Methods*	1	2,668	2,571	>10
16	5g	*Nature Reviews Neurology*	1	19,819	20,888	4,3
17	5h	*Neurologic Clinics*	1	3,072	2,638	8,8
18	5i	*Seminars in Neurology*	1	1,87	2,19	8,2

JAMA: Journal of the American Medical Association.

examined the clinical and epidemiological phenotype of hereditary ET, without finding primary OT.[77] Another study investigated the clinical and epidemiological features of tremor in multiple sclerosis, and primary OT was not detected.[78] The remaining three examined the evolution and syndromic associations of OT,[64] different clinical characteristics of ET, including OT,[101] and the frequency of inter-rater agreement and disagreement about ET diagnostic criteria, along with OT.[67]

Clinical: Classification

This wide category included consensus statement on diagnostic criteria for OT, novel description of the disease, its classification into subtypes, as well as targeted measures, and diagnostic tools. There were 14 OT papers in this category,[21,22,62,68,72–74,84,86,87,90,97,103] including one citation classic.[59]

Laboratory: Pathophysiology

Works analyzing pathophysiological processes underlying OT were incorporated in this category. There were 10 studies, employing neurophysiological[60,70,79,89,92,94,100,102] and neuroimaging[85,104] techniques. There were six studies on physiology,[60,70,92,94,100,102] two on pathology,[79,104] and one in both.[89]

Clinical: Medical therapies

Research articles related to the application of medical and nonsurgical treatments were included in this category. There were two articles on medical treatment, with one RCT on gabapentin,[65] and one case report on levodopa.[95]

Clinical: Surgical therapies

Research articles regarding primarily surgical treatment were incorporated in this category. There were two articles about the effect of deep brain stimulation of the ventral intermediate nucleus of the thalamus (Vim-DBS) for drug-refractory OT, including one case series[71] and one case report,[75] with positive results.

Review articles

There were included 17 review articles: seven about OT pathophysiology[61,63,66,76,80,81,91,108] and the rest reviewing general aspects,[23,69,82,93] apart from diagnosis,[88,96,98,99] treatment,[99] and the effect of transcranial magnetic stimulation.[83]

Time trends and journals

The publication years of the most cited articles are outlined in Figure 1A. This revealed a peak generation of the most cited OT articles for

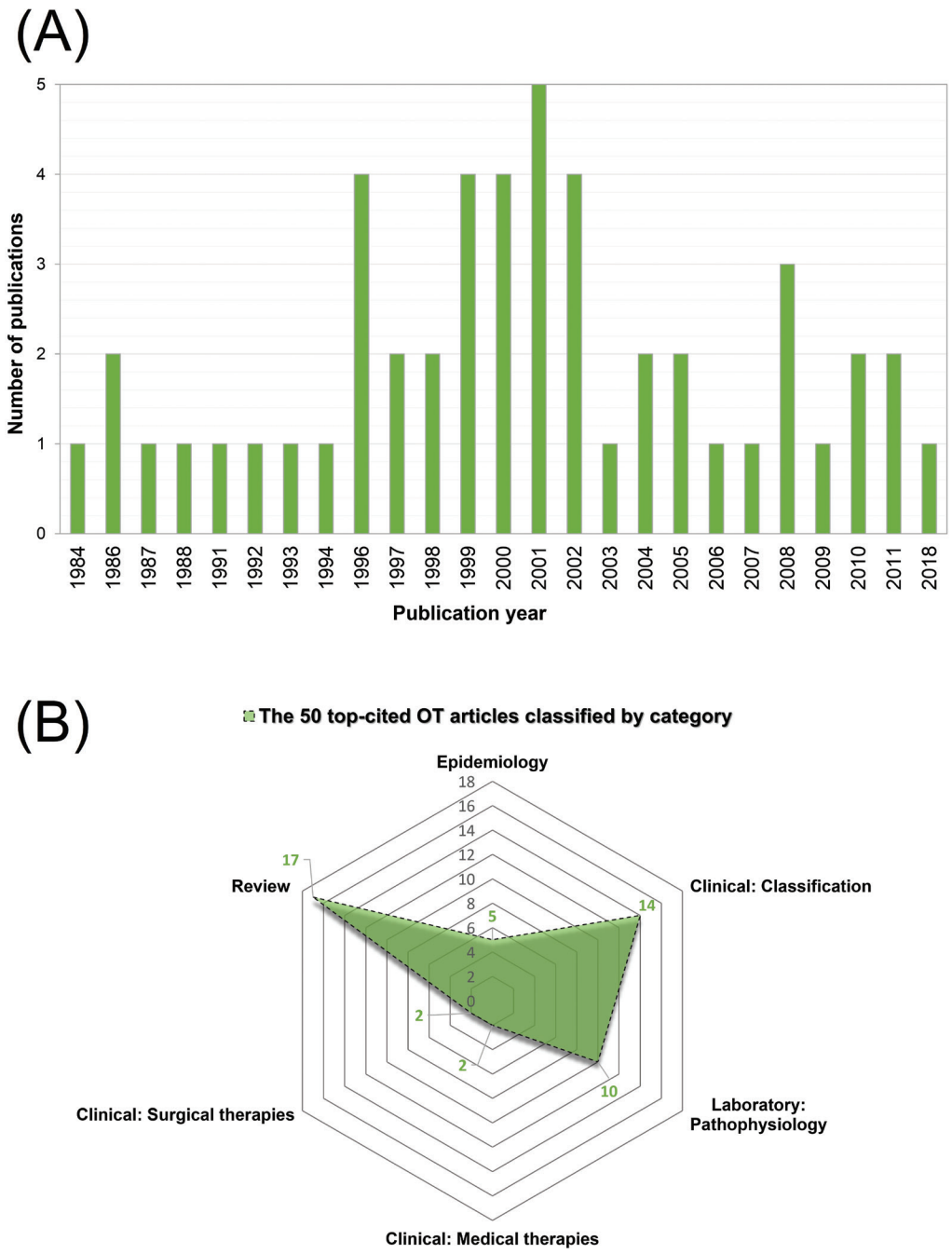

Figure 1. (A) Publication years for the 50 top-cited orthostatic tremor (OT) articles. (B) Plot showing the number of OT articles by category.

works published between 1996 and 2002.[59–63,65–67,70,76,78–85,87,89,91–95] The most cited articles were published in 18 journals. The top 5 journals accounted for 33 (66%) of the 50 most-cited OT articles[22,59–90] (Table 2).

Discussion

In the medical literature, the study of the number of times authors reference an article is one measure of the influence of the publication, and this type of citation analysis is widespread.[3–5] The assessment of specialty-wide citation analysis has been notified in other areas of the neurosciences.[2,9–19,106] By ranking the 50 most-cited papers, we sought to establish which published journal articles in OT have greater influence on citation impact. The top article was cited 1,206 times.[59] This figure is considerably lower than that found in PD, in which the top-cited article earned 4,327 citations.[11]

Table 3. **Authors with two or more of the 50 top-cited OT articles (ranked by number of citations)**

Absolute number	Rank	Author	Number of citations	Number of articles		h-index
				As first author	As co-author	
1	1	Deuschl G	10	4	6	10
2	2	Marsden CD	6	0	6	6
3	3a	Jankovic J	5	2	3	5
4	3b	Thompson PD	5	1	4	5
5	3c	Rothwell JC	5	0	5	5
6	4a	Findley LJ	4	1	3	4
7	4b	Brown P	4	0	4	4
8	5a	Katzenschlager R	3	2	1	3
9	5b	Elble RJ	3	1	2	3
10	5c	Lauk M	3	1	2	3
11	5d	Raethjen J	3	1	2	3
12	5f	Day BL	3	0	3	3
13	5g	Lees AJ	3	0	3	3
14	5h	Timmer J	3	0	3	3
15	6a	Wills AJ	2	2	0	2
16	6b	Bain PG	2	1	1	2
17	6c	Gerschlager W	2	1	1	2
18	6d	Hallett M	2	1	1	2
19	6e	Koster B	2	1	1	2
20	6f	Bain P	2	0	2	2
21	6g	Bhatia KP	2	0	2	2
22	6h	Bloem BR	2	0	2	2
23	6i	Gresty MA	2	0	2	2
24	6j	Guschlbauer B	2	0	2	2
25	6k	Krack P	2	0	2	2
26	6l	Lindemann M	2	0	2	2
27	6m	Louis ED	2	0	2	2
28	6n	Lucking CH	2	0	2	2

Most of the top-cited OT articles were usually published in specialized journals such as *Movement Disorders*, *Brain*, *Journal of Clinical Neurophysiology*, *Neurology*, and *Clinical Neurophysiology* (Table 2). In 2002, Callaham et al.[107] noticed that the strongest predictor of article's citations per year was the impact factor of the original publishing journal, instead of the methodology or quality of the research. By contrast, as our study has demonstrated, the current citation value of the individual paper is not positively correlated with the journal's impact factor. An example would be articles published in the *Journal of Clinical Neurophysiology*, representing the third journal of those that published the 50 top-cited OT articles, much higher than expected by the journal's impact factor. This is presumably attributable to contributions on pathophysiology[80,81,83] and classification[82] of OT from these papers. This implies that publishing remarkable neurophysiology and classification works in specialized journals is also able to achieve significant impact.

Overall, as can be seen from Figure 1A, the 50 top-cited articles in OT were articles that have been available for 20 or more years, and only one target article was published more recently (in 2018). It has been reported that scientific articles begin to be cited 1 or 2 years after publication and reach a maximum citation rate of 7 to 10 years

Table 4. **Institution of origin of the 50 top-cited OT articles based on first author's affiliation (ranked by number of articles)**

Absolute number	Rank	Institution of origin	Number of articles
1	1	University College London, London, UK	12
2	2	University of Keil, Keil, Germany	8
3	3	Baylor College of Medicine, Houston, Texas, USA	4
4	4a	Southern Illinois University School of Medicine, Springfield, Illinois, USA	3
5	4b	University of Freiburg, Freiburg, Germany	3
6	5a	Columbia University, New York, New York, USA	2
7	5b	Radboud University Nijmegen, Nijmegen, The Netherlands	2
8	5c	University of Eastern Piedmont "Amedeo Avogadro", Novara, Italy	2
9	6a	Imperial College School of Medicine, London, UK	1
10	6b	University of Oxford, Oxford, UK	1
11	6c	Oldchurch Hospital, London, UK	1
12	6d	King's College London, London, UK	1
13	6e	Boston University, Boston, Massachusetts, USA	1
14	6f	Mayo Clinic, Rochester, Minnesota, USA	1
15	6e	National Institutes of Health, Bethesda, Maryland, USA	1
16	6h	University of Florida College of Medicine, Gainesville, Florida, USA	1
17	6i	Medical College of Georgia, Augusta, Georgia, USA	1
18	6j	University of Mississippi Medical Center, Jackson, Mississippi, USA	1
19	6k	University of Cincinnati, Cincinnati, Ohio, USA	1
20	6l	Mayo Clinic, Jacksonville, Florida, USA	1
21	6m	Sección de Enfermedades Extrapiramidales, Centro Neurológico, Hospital Francés, Buenos Aires, Argentina	1
22	6n	Hospital Universitario 12 de Octubre, Madrid, Spain	1
23	6o	Clínica Universitaria, Universidad de Navarra, Pamplona, Spain	1
24	6p	University of Bologna, Bologna, Italy	1
25	6q	Saint-Antoine Hospital, AP-HP, Paris, France	1
26	6r	Lund University, Lund, Sweden	1
27	6s	University of Munich, Munich, Germany	1
28	6t	Chang-Gung Memorial Hospital, Taipei, Taiwan	1

AP: Assistance Publique; HP: Hôpitaux de Paris; UK: United Kingdom; USA: United States of America.

after publication.[108] However, an interval of 10 to 20 years is needed for the maximal recognition of prominent articles in a field.[54,109] This may explain why recently published articles were seldom cited and few appeared on the list.

Among the 50 top-cited OT articles, the most widespread design was the expert opinion (n = 22), followed by the case series (n = 21) (Table 1), illustrating that descriptive and observational studies, respectively, are most frequent for OT. This fact indicates the relative ease to accomplish simpler study designs in OT. In order of importance of research, study designs, systematic reviews, meta-analyses, and well-conducted RCTs yield the highest quality of evidence for most clinical or interventional questions, and the lowest value corresponds to expert opinions. Among the 50 target articles, there were only one RCT, being among the top 20 OT articles.[65] This is consistent with the contributions of the studies that have analyzed the most-cited papers in other fields.[2,9,108,110–118] There are several potential reasons for the low numbers of RCTs. Firstly, RCTs are time- and money-consuming studies. Secondly, it is hard to recruit large sample and control groups. Thirdly, it is possible that RCTs were published comparatively recently, and thus, they still have not attained a representative number of citations.

Table 5. **Level of evidence of the 50 top-cited OT articles**

Level of evidence	Study type	Number of articles
1	High-quality, properly powered and conducted RCT	1
	Systematic review of these studies	0
	Meta-analysis of these studies	0
2	Well-designed controlled trial without randomization	0
	Prospective comparative cohort trial	0
3	Retrospective cohort study	0
	Case-control study	2
	Systematic review of these studies	0
4	Case series with or without intervention	21
	Cross-sectional study	0
5	Expert opinion	22
	Case report	4
	Bench research	0

Adapted from the Oxford Centre for Evidence-Based Medicine (2011).[56]
RCT: Randomized controlled trial.

By category, the most cited OT studies were review articles (n = 17),[23,61,63,66,69,76,80–83,88,91,93,96,98,99,108] followed by clinical classification (n = 14),[21,22,59,62,68,72–74,84,86,87,90,97,103] laboratory pathophysiology (n = 10),[60,70,79,85,89,92,94,100,102,104] epidemiology (n = 5),[64,67,77,78,101] clinical medical (n = 2)[65,95] and surgical (n = 2)[71,75] therapies (Table 1).

Compared to ET[9,10] and PD,[11] articles concerning epidemiology, clinical classification, genetics, pathophysiology, and medical and surgical treatment are scarce, demonstrating that OT is a smaller area of research in neurology.

Trends over time unveiled that the peak period when most cited OT papers were published was between 1996 and 2002. The proposed explanations for the peak during this time are that this period was especially active and profitable with outstanding success in clinical and neurophysiological characterization, as well as development of new medical and surgical therapies, assisting in the improvement of diagnosis and treatment of OT, respectively. Another potential explanation for the aforementioned peak may be a critical attribute of modern research as older articles are no longer cited because they have been replaced by more recent studies that have replicated their findings and produced more accurate information.[18]

In parallel, the latest studies have had not been given sufficient time to become settled as most cited OT articles, for instance, "Smartphone apps provide a simple, accurate bedside screening tool for orthostatic tremor".[39]

Finally, our review of the most cited OT articles might be worthwhile on the basis of different grounds. Firstly, our observations suggest that the authors of citation classics in OT have produced more highly cited articles. Secondly, we have noticed several qualities contributing favourably to article citation, indicating that journal, country, and institution of origin are major factors. Finally, we identified only one Level 1 study among the most-cited OT articles.[65] Although the future of OT citation may be in higher level of evidence literature, nonetheless, this has not yet been a pivotal element of citation in the OT scenario.

Limitations

Seven major limitations of this review article must be noted. Firstly, notwithstanding the choice of Web of Science over Google Scholar which indexes a broader range of academic papers that could have had any influence on results, earlier reviews in other disciplines disclosed very similar results using these two search engines when the study field was small, as in our case with OT.[18,106] Secondly, search term may not have brought all possible results despite our inclusion of an extensive keyword as "orthostatic tremor". Likewise, for the Web of Science search engine, it may be possible to carry out either a title- or topic-based search. Given the small volume of the OT field, a topic-based search was preferred to recover all possible matches as stated above in the methods section. Conversely, a citation analysis study on OT by using a title-based search would have achieved fewer results.[9] Thirdly, this kind of citation analysis does exclude citations in textbooks and lectures, and an author's or authors' potential bias to cite articles in the journal they intend to publish their manuscripts.[119] Fourthly, there is a definite time effect in citation analysis, with recent studies earning fewer citations than the older ones.[120,121] Fifthly, the language of publication has a key role, with an inherent bias for articles published in English being overrepresented. Sixthly, applying Kuhn's philosophy of science[122–124] to the focus of this review, and therefore, considering a paradigm as a core concept, authors of a scientific community would be prone to cite a paradigmatic paper because of its high citations instead of its content or quality. Seventhly, the classification of most-cited papers represents a dynamic state, modifying as time goes by, and hence is a snapshot of a point in time, reflecting an overview about the current situation of research on the matter.

Conclusions

Writing highly cited articles in OT may be facilitated primarily by appropriate choice of source journal (e.g., *Movement Disorders*), study design (e.g., expert opinion), category (e.g., review), and language of publication (English). And at later stage, it could be also important taking into account country (e.g., USA or UK) and institution (e.g., University College London) of origin.

To the best of our knowledge, this is the first bibliometric study to illustrate the most-cited articles in OT research. Noteworthy, the peak of citations has decreased since 2008. Contrary to ET[9,10] and PD,[11] there are much fewer articles, as well as absence of citation classics, on epidemiology, clinical classification, genetics, pathophysiology, and medical and surgical treatment fields intended for further development of knowledge about this puzzling and challenging condition, which may severely impact on health-related quality of life. Sustaining that OT is a smaller field of research in neurology.

Although progress has been made in the diagnosis and treatment of OT, unfortunately, the correct diagnosis is often overlooked, delaying early administration of appropriate therapy, which is usually not completely successful. Therefore, these findings demonstrate that more studies are warranted to gain further insights into the nature and management of OT. Ultimately, it is essential to acknowledge top-cited OT articles because they involve landmarks and advances in OT.

References

1. Bibliometrics. OECD glossary of statistical terms. OECD. March 28, 2013. Available from: https://stats.oecd.org/glossary/detail.asp?ID=198 [cited 06 April 2019].

2. Lefaivre KA, Shadgan B, O'Brien PJ. 100 most cited articles in orthopaedic surgery. *Clin Orthop Relat Res* 2011;469:1487–1497. doi: 10.1007/s11999-010-1604-1

3. Adams AB, Simonson D. Publication, citations, and impact factors of leading investigators in critical care medicine. *Respir Care* 2004;49:276–281.

4. Cheek J, Garnham B, Quan J. What's in a number? Issues in providing evidence of impact and quality of research(ers). *Qual Health Res* 2006;16:423–435. doi: 10.1177/1049732305285701

5. Garfield E. Citation analysis as a tool in journal evaluation. *Science* 1972;178:471–479. doi: 10.1126/science.178.4060.471

6. Ladwig JP, Sommese AJ. Using cited half-life to adjust download statistics. *Coll Res Libr* 2005;66:527–542. doi: 10.5860/crl.66.6.527

7. Banaszkiewicz PA. Main introduction. In: Banaszkiewicz PA, Kader DF, editors. Classic papers in orthopaedics. London: Springer-Verlag; 2014. pp. 1–6. doi: 10.1007/978-1-4471-5451-8_1

8. Benito-León J, Domingo-Santos Á. Orthostatic tremor: an update on a rare entity. *Tremor Other Hyperkinet Mov (N Y)* 2016;6:411. doi: 10.7916/D81N81BT

9. Benito-León J, Louis ED. The top 100 cited articles in essential tremor. *Tremor Other Hyperkinet Mov (N Y)* 2013;3:pii: tre-03-186-4307-1. doi: 10.7916/D8TM78VV

10. King NK, Tam J, Fasano A, Lozano AM. The most cited works in essential tremor and dystonia. *Tremor Other Hyperkinet Mov (N Y)* 2016;6:310. doi: 10.7916/D8NG4QHP

11. Ponce FA, Lozano AM. The most cited works in Parkinson's disease. *Mov Disord* 2011;26:380–390. doi: 10.1002/mds.23445

12. Ibrahim GM, Snead OC 3rd, Rutka JT, Lozano AM. The most cited works in epilepsy: trends in the "Citation Classics". *Epilepsia* 2012;53:765–770. doi: 10.1111/j.1528-1167.2012.03455.x

13. Gonzalez de Dios J, Alonso-Arroyo A, Sempere AP, et al. [Productivity and impact of Spanish research into multiple sclerosis (1996–2010)]. *Rev Neurol* 2013;56:409–419. doi: 10.33588/rn.5608.2013124. [Article in Spanish]

14. Nieder C, Grosu AL, Mehta MP. Brain metastases research 1990–2010: pattern of citation and systematic review of highly cited articles. *Scientific World Journal* 2012;2012:721598. doi: 10.1100/2012/721598

15. Ponce FA, Lozano AM. Highly cited works in neurosurgery. Part I: the 100 top-cited papers in neurosurgical journals. *J Neurosurg* 2010;112:223–232. doi: 10.3171/2009.12.JNS091599

16. Ponce FA, Lozano AM. Highly cited works in neurosurgery. Part II: the citation classics. *J Neurosurg* 2010;112:233–246. doi: 10.3171/2009.12.JNS091600

17. Heros RC. Highly cited works in neurosurgery. *J Neurosurg* 2010;112:220–222. doi: 10.3171/2009.11.JNS091706

18. Lipsman N, Lozano AM. Measuring impact in stereotactic and functional neurosurgery: an analysis of the top 100 most highly cited works and the citation classics in the field. *Stereotact Funct Neurosurg* 2012;90:201–209. doi: 10.1159/000337170

19. Alotaibi NM, Nassiri F, Badhiwala JH, et al. The most cited works in aneurysmal subarachnoid hemorrhage: a bibliometric analysis of the 100 most cited articles. *World Neurosurg* 2016;89:587–592.e6. doi: 10.1016/j.wneu.2015.11.072

20. Burak Atci I, Yilmaz H, Samanci MY. The top 50 most-cited articles on low-grade glioma: a bibliometric analysis. *Br J Neurosurg* 2019:1–5. doi: 10.1080/02688697.2018.1549314. [Epub ahead of print]

21. Heilman KM. Orthostatic tremor. *Arch Neurol* 1984;41:880–881. doi: 10.1001/archneur.1984.04050190086020

22. Bhatia KP, Bain P, Bajaj N, et al. Consensus Statement on the classification of tremors. From the task force on tremor of the International Parkinson and Movement Disorder Society. *Mov Disord* 2018;33:75–87. doi: 10.1002/mds.27121

23. Elble RJ. Tremor: clinical features, pathophysiology, and treatment. *Neurol Clin* 2009;27:679–695, v–vi. doi: 10.1016/j.ncl.2009.04.003

24. Labiano-Fontcuberta A, Benito-Leon J, Dominguez-Gonzalez C. [Orthostatic tremor: an enigmatic condition]. *Rev Neurol* 2012;54:425–534. doi: 10.33588/rn.5407.2011544. [Article in Spanish]

25. Hassan A, Ahlskog JE, Matsumoto JY, Milber JM, Bower JH, Wilkinson JR. Orthostatic tremor: clinical, electrophysiologic, and treatment findings in 184 patients. *Neurology* 2016;86:458–464. doi: 10.1212/WNL.0000000000002328

26. Benito-León J, Domingo-Santos A, Hassan A, Ahlskog JE, Matsumoto JY, Bower JH. Orthostatic tremor: clinical, electrophysiologic, and treatment findings in 184 patients. *Neurology* 2016;87:341. doi: 10.1212/WNL.0000000000002907

27. Morales-Briceño H, Fois AF, Fung VSC. Tremor. *Handb Clin Neurol* 2018;159:283–301. doi: 10.1016/B978-0-444-63916-5.00018-5

28. Feil K, Böttcher N, Guri F, et al. Long-term course of orthostatic tremor in serial posturographic measurement. *Parkinsonism Relat Disord* 2015;21:905–910. doi: 10.1016/j.parkreldis.2015.05.021

29. Benito-León J, Louis ED, Puertas-Martín V, et al. Cognitive and neuropsychiatric features of orthostatic tremor: a case-control comparison. *J Neurol Sci* 2016;361:137–143. doi: 10.1016/j.jns.2015.12.031

30. Nieuwhof F, Panyakaew P, van de Warrenburg BP, Gallea C, Helmich RC. The patchy tremor landscape: recent advances in pathophysiology. *Curr Opin Neurol* 2018;31:455–461. doi: 10.1097/WCO.0000000000000582

31. Antelmi E, Rocchi L, Cocco A, et al. Cerebellar and brainstem functional abnormalities in patients with primary orthostatic tremor. *Mov Disord* 2018;33:1024–1025. doi: 10.1002/mds.27331

32. Whitney D, Bhatti D, Torres-Russotto D. Orthostatic tremor: pathophysiology guiding treatment. *Curr Treat Options Neurol* 2018;20:35. doi: 10.1007/s11940-018-0524-3

33. Maugest L, McGovern EM, Mazalovic K, et al. Health-related quality of life is severely affected in primary orthostatic tremor. *Front Neurol* 2018;8:747. doi: 10.3389/fneur.2017.00747

34. Lenka A, Pal PK, Bhatti DE, Louis ED. Pathogenesis of primary orthostatic tremor: current concepts and controversies. *Tremor Other Hyperkinet Mov (N Y)* 2017;7:513. doi: 10.7916/D8W66ZBH

35. Yoo SW, Choi KE, So J, Lee KS, Kim JS. Pseudo-orthostatic tremor in idiopathic Parkinson's disease: could it be re-emergent tremor? *Neurol Sci* 2019;40:621–623. doi: 10.1007/s10072-018-3605-x

36. Mousele C, Bentley P, Tai YF. A rare presentation of orthostatic tremor as abdominal tremor. *Tremor Other Hyperkinet Mov (N Y)* 2018;8:603. doi: 10.7916/D8W10PTG

37. Lenka A, Louis ED. Revisiting the clinical phenomenology of "cerebellar tremor": beyond the intention tremor. *Cerebellum* 2019;18(3):565–574. doi: 10.1007/s12311-018-0994-6. [Epub ahead of print]

38. Wuehr M, Schlick C, Möhwald K, Schniepp R. Walking in orthostatic tremor modulates tremor features and is characterized by impaired gait stability. *Sci Rep* 2018;8:14152. doi: 10.1038/s41598-018-32526-8

39. Bhatti D, Thompson R, Hellman A, Penke C, Bertoni JM, Torres-Russotto D. Smartphone apps provide a simple, accurate bedside screening tool for orthostatic tremor. *Mov Disord Clin Pract* 2017;4:852–857. doi: 10.1002/mdc3.12547

40. Evidente VGH, Baker ZJ, Evidente MH, Garrett R, Lambert M, Ponce FA. Orthostatic tremor is responsive to bilateral thalamic deep brain stimulation: report of two cases performed asleep. *Tremor Other Hyperkinet Mov (N Y)* 2018;8:566. doi: 10.7916/D8KS882G

41. Vijiaratnam N, Sirisena D, Paul E, Bertram KL, Williams DR. Measuring disease progression and disability in orthostatic tremor. *Parkinsonism Relat Disord* 2018;55:138–140. doi: 10.1016/j.parkreldis.2018.06.014

42. Wuehr M, Schlick C, Möhwald K, Schniepp R. Proprioceptive muscle tendon stimulation reduces symptoms in primary orthostatic tremor. *J Neurol* 2018;265:1666–1670. doi: 10.1007/s00415-018-8902-z

43. Ruiz-Julián M, Orozco JL, Gironell A. Complete resolution of symptoms of primary orthostatic tremor with perampanel. *Tremor Other Hyperkinet Mov (N Y)* 2018;8:552. doi: 10.7916/D8QZ3SZD

44. Artusi CA, Farooqi A, Romagnolo A, et al. Deep brain stimulation in uncommon tremor disorders: indications, targets, and programming. *J Neurol* 2018;265:2473–2493. doi: 10.1007/s00415-018-8823-x

45. Kamble N, Pal PK. Tremor syndromes: a review. *Neurol India* 2018;66:S36–S47. doi: 10.4103/0028-3886.226440

46. Bhatti D, Thompson R, Xia Y, et al. Comprehensive, blinded assessment of balance in orthostatic tremor. *Parkinsonism Relat Disord* 2018;47:22–25. doi: 10.1016/j.parkreldis.2017.11.335

47. Lehn AC, O'Gorman C, Olson S, Salari M. Thalamic ventral intermediate nucleus deep brain stimulation for orthostatic tremor. *Tremor Other Hyperkinet Mov (N Y)* 2017;7:479. doi: 10.7916/D8280JHR

48. Balachandar A, Fasano A. Characterizing orthostatic tremor using a smartphone application. *Tremor Other Hyperkinet Mov (N Y)* 2017;7:488. doi: 10.7916/D8V12GRJ

49. Mailankody P, Netravathi M, Pal PK. Review of tremor in Parkinson's disease and atypical Parkinsonian disorders. *Neurol India* 2017;65:1083–1090. doi: 10.4103/neuroindia.NI_880_16

50. Larrosa Campo D, Ramón Carbajo C, García Urruzola F, Calleja Puerta S. Orthostatic tremor as the only manifestation of thyrotoxicosis following cerebral angiography. *Neurologia* 2019;34:137–138. doi: 10.1016/j.nrl.2017.05.001

51. Merola A, Fasano A, Hassan A, et al. Thalamic deep brain stimulation for orthostatic tremor: a multicenter international registry. *Mov Disord* 2017;32:1240–1244. doi: 10.1002/mds.27082

52. Chiang HL, Tai YC, McMaster J, Fung VS, Mahant N. Primary orthostatic tremor: is deep brain stimulation better than spinal cord stimulation? *J Neurol Neurosurg Psychiatry* 2017;88:804–805. doi: 10.1136/jnnp-2016-315188

53. Martínez MA, Herrera M, López-Gijón J, Herrera-Viedma E. H-classics: characterizing the concept of citation classics through H-index. *Scientometrics* 2014;98:1971–1983. doi: 10.1007/s11192-013-1155-9

54. Garfield E. 100 citation classics from the Journal of the American Medical Association. *JAMA* 1987;257:52–59. doi: 10.1001/jama.1987.03390010056028

55. Garfield E. What is a citation classic? *Citation Classics.* 2016. Available from: http://garfield.library.upenn.edu/classics.html [cited 06 April 2019].

56. Oxford Centre for Evidence-Based Medicine (OCEBM). Levels of evidence (2011). 2016. Available from: https://www.cebm.net/2016/05/ocebm-levels-of-evidence/ [cited 06 April 2019].

57. Ishii LE. Thoughtful methods to increase evidence levels and analyze nonparametric data. *JAMA Facial Plast Surg* 2015;17:307–308. doi: 10.1001/jamafacial.2015.0465

58. Hirsch JE. An index to quantify an individual's scientific research output. *Proc Natl Acad Sci U S A* 2005;102:16569–16572. doi: 10.1073/pnas.0507655102

59. Deuschl G, Bain P, Brin M, et al. Consensus statement of the Movement Disorder Society on tremor. Ad Hoc Scientific Committee. *Mov Disord* 1998;13:2–23. doi: 10.1002/mds.870131303

60. Raethjen J, Lindemann M, Schmaljohann H, Wenzelburger R, Pfister G, Deuschl G. Multiple oscillators are causing parkinsonian and essential tremor. *Mov Disord* 2000;15:84–94. doi: 10.1002/1531-8257(200001)15:1<84::AID-MDS1014>3.0.CO;2-K

61. Wilms H, Sievers J, Deuschl G. Animal models of tremor. *Mov Disord* 1999;14:557–571. doi: 10.1002/1531-8257(199907)14:4<557::AID-MDS1004>3.0.CO;2-G

62. Jankovic J. Essential tremor: a heterogenous disorder. *Mov Disord* 2002;17:638–644. doi: 10.1002/mds.10221

63. Deuschl G, Bergman H. Pathophysiology of nonparkinsonian tremors. *Mov Disord* 2002;17:S41–S48. doi: 10.1002/mds.10141

64. Gerschlager W, Münchau A, Katzenschlager R, et al. Natural history and syndromic associations of orthostatic tremor: a review of 41 patients. *Mov Disord* 2004;19:788–795. doi: 10.1002/mds.20132

65. Ondo W, Hunter C, Vuong KD, Schwartz K, Jankovic J. Gabapentin for essential tremor: a multiple-dose, double-blind, placebo-controlled trial. *Mov Disord* 2000;15:678–682. doi: fdgd10.1002/1531-8257(200007)15:4<678::AID-MDS1012>3.0.CO;2-0

66. Hallett M. Overview of human tremor physiology. *Mov Disord* 1998;13:43–48. doi: 10.1002/mds.870131308

67. Chouinard S, Louis ED, Fahn S. Agreement among movement disorder specialists on the clinical diagnosis of essential tremor. *Mov Disord* 1997;12:973–976. doi: 10.1002/mds.870120621

68. FitzGerald PM, Jankovic J. Orthostatic tremor: an association with essential tremor. *Mov Disord* 1991;6:60–64. doi: 10.1002/mds.870060111

69. Elble R, Deuschl G. Milestones in tremor research. *Mov Disord* 2011;26:1096–1105. doi: 10.1002/mds.23579

70. Wu YR, Ashby P, Lang AE. Orthostatic tremor arises from an oscillator in the posterior fossa. *Mov Disord* 2001;16:272–279. doi: 10.1002/mds.1045

71. Espay AJ, Duker AP, Chen R, et al. Deep brain stimulation of the ventral intermediate nucleus of the thalamus in medically refractory orthostatic tremor: preliminary observations. *Mov Disord* 2008;23:2357–2362. doi: 10.1002/mds.22271

72. Piboolnurak P, Yu QP, Pullman SL. Clinical and neurophysiologic spectrum of orthostatic tremor: case series of 26 subjects. *Mov Disord* 2005;20: 1455–1461. doi: 10.1002/mds.20588

73. Papa SM, Gershanik OS. Orthostatic tremor: an essential tremor variant? *Mov Disord* 1988;3:97–108. doi: 10.1002/mds.870030201

74. Semenescu S, Roze E, Vidailhet M, et al. Myoclonus or tremor in orthostatism: an under-recognized cause of unsteadiness in Parkinson's disease. *Mov Disord* 2007;22:2063–2069. doi: 10.1002/mds.21651

75. Guridi J, Rodriguez-Oroz MC, Arbizu J, et al. Successful thalamic deep brain stimulation for orthostatic tremor. *Mov Disord* 2008;23:1808–1811. doi: 10.1002/mds.22001

76. McAuley JH, Marsden CD. Physiological and pathological tremors and rhythmic central motor control. *Brain* 2000;123:1545–1567. doi: 10.1093/brain/123.8.1545

77. Bain PG, Findley LJ, Thompson PD, et al. A study of hereditary essential tremor. *Brain* 1994;117:805–824. doi: 10.1093/brain/117.4.805

78. Alusi SH, Worthington J, Glickman S, Bain PG. A study of tremor in multiple sclerosis. *Brain* 2001;124:720–730. doi: 10.1093/brain/124.4.720

79. Fung VS, Sauner D, Day BL. A dissociation between subjective and objective unsteadiness in primary orthostatic tremor. *Brain* 2001;124:322–330. doi: 10.1093/brain/124.2.322

80. Elble RJ. Central mechanisms of tremor. *J Clin Neurophysiol* 1996;13: 133–144. doi: 10.1097/00004691-199603000-00004

81. Deuschl G, Krack P, Lauk M, Timmer J. Clinical neurophysiology of tremor. *J Clin Neurophysiol* 1996;13:110–121. doi: 10.1097/00004691-199603000-00002

82. Findley LJ. Classification of tremors. *J Clin Neurophysiol* 1996;13:122–132. doi: 10.1097/00004691-199603000-00003

83. Cantello R. Applications of transcranial magnetic stimulation in movement disorders. *J Clin Neurophysiol* 2002;19:272–293. doi: 10.1097/00004691-200208000-00003

84. Jankovic J. Essential tremor: clinical characteristics. *Neurology* 2000;54: S21–S25.

85. Wills AJ, Thompson PD, Findley LJ, Brooks DJ. A positron emission tomography study of primary orthostatic tremor. *Neurology* 1996;46:747–752. doi: 10.1212/wnl.46.3.747

86. Wee AS, Subramony SH, Currier RD. "Orthostatic tremor" in familial-essential tremor. *Neurology* 1986;36:1241–1245. doi: 10.1212/wnl.36.9.1241

87. Benito-León J, Rodríguez J, Ortí-Pareja M, Ayuso-Peralta L, Jiménez-Jiménez FJ, Molina JA. Symptomatic orthostatic tremor in pontine lesions. *Neurology* 1997;49:1439–1441. doi: 10.1212/WNL.49.5.1439

88. Visser JE, Carpenter MG, van der Kooij H, Bloem BR. The clinical utility of posturography. *Clin Neurophysiol* 2008;119:2424–2436. doi: 10.1016/j.clinph.2008.07.220

89. Lauk M, Köster B, Timmer J, Guschlbauer B, Deuschl G, Lücking CH. Side-to-side correlation of muscle activity in physiological and pathological human tremors. *Clin Neurophysiol* 1999;110:1774–1783. doi: 10.1016/S1388-2457(99)00130-3

90. Krafczyk S, Tietze S, Swoboda W, Valkovic P, Brandt T. Artificial neural network: a new diagnostic posturographic tool for disorders of stance. *Clin Neurophysiol* 2006;117:1692–1698. Doi: 10.1016/j.clinph.2006.04.022

91. Deuschl G, Raethjen J, Lindemann M, Krack P. The pathophysiology of tremor. *Muscle Nerve* 2001;24:716–735. doi: 10.1002/mus.1063

92. Köster B, Lauk M, Timmer J, et al. Involvement of cranial muscles and high intermuscular coherence in orthostatic tremor. *Ann Neurol* 1999;45:384–388. doi: 10.1002/1531-8249(199903)45:3<384::AID-ANA15>3.0.CO;2-J

93. Sethi KD. Clinical aspects of Parkinson disease. *Curr Opin Neurol* 2002;15:457–460. doi: 10.1097/00019052-200208000-00009

94. Yarrow K, Brown P, Gresty MA, Bronstein AM. Force platform recordings in the diagnosis of primary orthostatic tremor. *Gait Posture* 2001;13: 27–34. doi: 10.1016/s0966-6362(00)00097-7

95. Wills AJ, Brusa L, Wang HC, Brown P, Marsden CD. Levodopa may improve orthostatic tremor: case report and trial of treatment. *J Neurol Neurosurg Psychiatry* 1999;66:681-684. doi: 10.1136/jnnp.66.5.681

96. Katzenschlager R, Lees AJ. Olfaction and Parkinson's syndromes: its role in differential diagnosis. *Curr Opin Neurol* 2004;17:417–423. doi: 10.1097/01.wco.0000137531.76491.c2

97. McManis PG, Sharbrough FW. Orthostatic tremor: clinical and electrophysiologic characteristics. *Muscle Nerve* 1993;16:1254–1260. doi: 10.1002/mus.880161117

98. Nardone A, Schieppati M. The role of instrumental assessment of balance in clinical decision making. *Eur J Phys Rehabil Med* 2010;46:221–237. doi: 10.1007/s00455-002-0094-z

99. Puschmann A, Wszolek ZK. Diagnosis and treatment of common forms of tremor. *Semin Neurol* 2011;31:65–77. doi: 10.1055/s-0031-1271312

100. Wang SY, Aziz TZ, Stein JF, Liu X. Time-frequency analysis of transient neuromuscular events: dynamic changes in activity of the subthalamic nucleus and forearm muscles related to the intermittent resting tremor. *J Neurosci Methods* 2005;145:151–158. doi: 10.1016/j.jneumeth.2004.12.009

101. Martinelli P, Gabellini AS, Gulli MR, Lugaresi E. Different clinical features of essential tremor: a 200-patient study. *Acta Neurol Scand* 1987;75:106–111. doi: 10.1111/j.1600-0404.1987.tb07903.x

102. Thompson PD, Rothwell JC, Day BL, et al. The physiology of orthostatic tremor. *Arch Neurol* 1986;43:584–587. doi:10.1001/archneur.1986.00520060048016

103. Britton TC, Thompson PD, van der Kamp W, et al. Primary orthostatic tremor: further observations in six cases. *J Neurol* 1992;239:209–217. doi: 10.1007/bf00839142

104. Katzenschlager R, Costa D, Gerschlager W, et al. [123I]-FP-CIT-SPECT demonstrates dopaminergic deficit in orthostatic tremor. *Ann Neurol* 2003;53: 489–496. doi: 10.1002/ana.10475

105. Abdo WF, van de Warrenburg BP, Burn DJ, Quinn NP, Bloem BR. The clinical approach to movement disorders. *Nat Rev Neurol* 2010;6:29–37. doi: 10.1038/nrneurol.2009.196

106. Lipsman N, Woodside DB, Lozano AM. Trends in anorexia nervosa research: an analysis of the top 100 most cited works. *Eur Eat Disord Review* 2014;22:9–14. doi: 10.1002/erv.2270

107. Callaham M, Wears RL, Weber E. Journal prestige, publication bias, and other characteristics associated with citation of published studies in peer-reviewed journals. *JAMA* 2002;287:2847–2850. doi: 10.1001/jama.287.21.2847

108. Hui J, Han Z, Geng G, Yan W, Shao P. The 100 top-cited articles in orthodontics from 1975 to 2011. *Angle Orthod* 2013;83:491–499. doi: 10.2319/040512-284.1

109. Hall GM. BJA citation classics 1945–1992. *Br J Anaesth* 1998;80:4–6. doi: 10.1093/bja/80.1.4

110. Hennessey K, Afshar K, Macneily AE. The top 100 cited articles in urology. *Can Urol Assoc J* 2009;3:293–302. doi: 10.5489/cuaj.1123

111. Nason GJ, Tareen F, Mortell A. The top 100 cited articles in urology: an update. *Can Urol Assoc J* 2013;7:E16–E24. doi: 10.5489/cuaj.12223

112. Shadgan B, Roig M, Hajghanbari B, Reid WD. Top-cited articles in rehabilitation. *Arch Phys Med Rehabil* 2010;91:806–815. doi: 10.1016/j.apmr.2010.01.011

113. Sharma B, Lawrence DW. Top-cited articles in traumatic brain injury. *Front Hum Neurosci* 2014;8:879. doi: 10.3389/fnhum.2014.00879

114. Kreutzer JS, Agyemang AA, Weedon D, et al. The top 100 cited neurorehabilitation papers. *NeuroRehabilitation* 2017;40:163–174. doi: 10.3233/NRE-161415

115. Samanci Y, Samanci B, Sahin E. Bibliometric analysis of the top-cited articles on idiopathic intracranial hypertension. *Neurol India* 2019;67:78–84. doi: 10.4103/0028-3886.253969

116. Hwang JW, Kim H, Lee DJ. The 100 most influential manuscripts on hepatocellular carcinoma: a bibliometric analysis. *J Int Med Res* 2019;47:1467–1482. doi: 10.1177/0300060519835974

117. Parmar A, Ganesh R, Mishra AK. The top 100 cited articles on obsessive compulsive disorder (OCD): a citation analysis. *Asian J Psychiatr* 2019;42:34–41. doi: 10.1016/j.ajp.2019.03.025

118. Iqbal U, Rehan A, Akmal M, et al. Top 100 most influential articles in the field of myeloid neoplasms: a bibliometric study. *Acta Haematol* 2019;141:68–78. doi: 10.1159/000493251

119. Seglen PO. Why the impact factor of journals should not be used for evaluating research. *BMJ* 1997;314:498–502. doi: 10.1136/bmj.314.7079.497

120. Citation data: the wrong impact? *Nat Neurosci* 1998;1:641–642. doi: 10.1038/3639

121. Ioannidis JP, Boyack K, Wouters PF. Citation metrics: a primer on how (not) to normalize. *PLoS Biol* 2016;14:e1002542. doi: 10.1371/journal.pbio.1002542

122. Kuhn TS. Historical structure of scientific discovery. *Science* 1962;136:760–764. doi: 10.1126/science.136.3518.760

123. Rouse J. Kuhn's philosophy of scientific practice. In: Nickles T, editor. Thomas Kuhn (Contemporary Philosophy in Focus). Cambridge: Cambridge University Press; 2003, pp. 101–121. doi: 10.1017/cbo9780511613975.006

124. Firinci Orman T. "Paradigm" as a central concept in Thomas Kuhn's thought. *Int J Humanit Soc Sci* 2016:6:47–52.