# Anatomical Distribution of Involuntary Movements and Clinician-Reported Impact of Tardive Dyskinesia: A Real-World Analysis of the IMPACT-TD Registry

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Poster number: 153

**Objective: To examine the relationship between the anatomical distribution of involuntary movements and clinician-reported impact of tardive dyskinesia-associated movements**

## Background

- Tardive dyskinesia (TD) is a hyperkinetic movement disorder associated with exposure to dopamine receptor-blocking agents, including antipsychotic drugs[1]
- TD is characterized by involuntary, repetitive movements in the face, trunk, and extremities[2]
- Abnormal TD-associated movements may have a negative impact on multiple areas of functioning[3,4] and have been associated with worse quality of life[5]
- Understanding the relationship between the anatomical location of involuntary movements and the impact of TD on daily functioning may enhance clinical awareness of the burden of TD

## Methods

- The IMPACT-TD Registry is an ongoing, phase 4, 3-year longitudinal study
  - Individuals aged ≥18 years with a score of ≥2 on at least 1 item of the Abnormal Involuntary Movement Scale (AIMS) and with probable TD were included
  - Individuals with vesicular monoamine transporter type 2 (VMAT2) inhibitor treatment at enrollment were excluded from the current analysis
- Clinicians rated TD impact in 4 life domains (social, psychological/psychiatric, physical, and vocational/educational/recreational) using the IMPACT-TD clinician-reported-outcome (CliniRO) scale (4-point Likert scale, highest domain score = global score)[6]
- Individual AIMS item scores (muscles of facial expression, jaw, lips/perioral area, tongue, upper extremities, lower extremities, and trunk) and their relationship with moderate/severe CliniRO domain scores were evaluated
  - Each AIMS item was scored from 0–4 for abnormal movements (0 = none, 1 = minimal, 2 = mild, 3 = moderate, 4 = severe) (**Table 1**)

**Table 1. AIMS Scoring Definitions for Body Regions**

| 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| None = No abnormal movements observed | Minimal = Barely noticeable movement; could be within normal limits | Mild = Definite but not pronounced abnormal movement | Moderate = Clearly abnormal movement | Severe = Markedly abnormal movement (very noticeable) |

- Participants who experienced moderate/severe impact of TD in any life domain (per the IMPACT-TD CliniRO scale) had median AIMS item scores of 2 (mild) for muscles of facial expression and upper extremities, 1 (minimal) for the tongue and lower extremities, and 0 (none) for the trunk (**Table 2**)
  - When examining individual life domains, AIMS item scores varied for the lips/perioral area and in the jaw, with a median of 2 among participants experiencing social and physical impacts and a median score of 1 among those experiencing psychological/psychiatric and vocational impacts

**Table 2. Median AIMS Body Region Score in Patients With Moderate/Severe Impact of TD per IMPACT-TD CliniRO Domains**

| IMPACT-TD CliniRO domains | AIMS body region items | | | | | | |
|---|---|---|---|---|---|---|---|
| | Muscles of facial expression | Lips and perioral region | Jaw | Tongue | Upper extremities | Lower extremities | Trunk |
| Global, n | 327 | 327 | 326 | 326 | 326 | 325 | 326 |
| AIMS, median | **2** | **1** | **1** | **1** | **2** | **1** | **0** |
| Social, n | 225 | 223 | 224 | 224 | 224 | 223 | 224 |
| AIMS, median | **2** | **2** | **2** | **1** | **2** | **1** | **0** |
| Psychological, n | 264 | 264 | 263 | 263 | 263 | 262 | 263 |
| AIMS, median | **2** | **1** | **1** | **1** | **2** | **1** | **0** |
| Physical, n | 216 | 216 | 215 | 215 | 215 | 215 | 215 |
| AIMS, median | **2** | **2** | **2** | **1** | **2** | **1** | **0** |
| Vocational, n | 217 | 217 | 216 | 216 | 216 | 216 | 216 |
| AIMS, median | **2** | **1** | **1** | **1** | **2** | **1** | **0** |

- Among participants with an individual AIMS item score of 1 or 2 in any body region, 71% to 81% experienced moderate/severe global TD impact, with the highest rate seen in the psychological domain, particularly among those with tongue movements (**Table 3**)

**Table 3. Percentage of Patients With Moderate/Severe Impact per Baseline Body Region AIMS (Score of 1 or 2)**

| | IMPACT-TD CliniRO domains | | | | |
|---|---|---|---|---|---|
| Body region AIMS score, 1 or 2 | Social | Psychological | Physical | Vocational | Global |
| Muscles of facial expression (n=260) | 49 | 58 | 45 | 47 | 71 |
| Lips and perioral region (n=225) | 52 | 59 | 48 | 49 | 72 |
| Jaw (n=201) | 53 | 57 | 51 | 50 | 74 |
| Tongue (n=238) | 52 | 67 | 52 | 58 | 81 |
| Upper extremities (n=236) | 50 | 62 | 45 | 53 | 77 |
| Lower extremities (n=174) | 49 | 55 | 52 | 46 | 74 |
| Trunk (n=108) | 58 | 61 | 56 | 47 | 75 |

The percentages of patients shown in the table cells are coded from green (0%) to red (100%)

- Among participants with individual AIMS item scores of 3 or 4 in any body region, 88% to 97% experienced moderate/severe global impact of TD
- Among participants with an AIMS score of 3 or 4 in muscles of facial expression, lower extremities, or trunk, ≥80% experienced moderate/severe impact of TD in each CliniRO domain (**Table 4**)
  - Although the social domain had the highest rates of moderate/severe impact among participants with AIMS scores of 3 or 4 in muscles of facial expression or the tongue, the physical domain was most frequently affected by movements in the remaining body regions

**Table 4. Percentage of Patients With Moderate/Severe Impact per Baseline Body Region AIMS (Score of 3 or 4)**

| | IMPACT-TD CliniRO domains | | | | |
|---|---|---|---|---|---|
| Body region AIMS score, 3 or 4 | Social | Psychological | Physical | Vocational | Global |
| Muscles of facial expression (n=69) | 85 | 84 | 84 | 80 | 97 |
| Lips and perioral region (n=84) | 73 | 73 | 79 | 61 | 92 |
| Jaw (n=89) | 70 | 75 | 83 | 63 | 92 |
| Tongue (n=59) | 76 | 73 | 75 | 58 | 88 |
| Upper extremities (n=91) | 75 | 78 | 81 | 64 | 91 |
| Lower extremities (n=60) | 82 | 85 | 87 | 80 | 95 |
| Trunk (n=36) | 89 | 86 | 94 | 83 | 94 |

The percentages of patients shown in the table cells are coded from green (0%) to red (100%)

## Conclusions

- Individuals can experience moderate/severe multidimensional impact of TD even when individual AIMS component scores are mild in severity
- Pronounced movements involving the muscles of facial expression, lower extremities, and trunk are most consistently linked to moderate/severe TD-related impact across multiple functional domains
- These findings underscore the need for clinicians to assess TD functional impact in addition to assessing movement severity

## Demographics

- 438 participants in the IMPACT-TD Registry who were not receiving VMAT2i treatment at baseline and had recorded AIMS scores were included in this analysis
  - Included participants had a mean age of 50.5 years; 84.5% were aged <65 years; 51.6% were men, and 59.6% were White (**Table 5**)
  - The most common baseline psychiatric diagnoses were schizophrenia (39.3%) and depression (39.0%), and most participants (59.8%) had received prior treatment with only second-generation or later antipsychotics (**Table 6**)

**Table 5. Demographic Characteristics**

| | No VMAT2 inhibitor with baseline AIMS score (N=438) |
|---|---|
| Age at index, mean (SD) [range], years | 50.5 (14.5) [18–88] |
| Age group, years | |
| 18–45 | 165 (37.7) |
| 46–65 | 205 (46.8) |
| >65 | 68 (15.5) |
| Sex | |
| Men | 226 (51.6) |
| Women | 212 (48.4) |
| Race | |
| White | 261 (59.6) |
| Black/African American | 97 (22.1) |
| Other | 40 (9.1) |
| Not reported | 40 (9.1) |
| Ethnicity | |
| Not Hispanic or Latino | 312 (71.2) |
| Hispanic or Latino | 111 (25.3) |
| Unknown/Not reported | 15 (3.4) |

Values shown are n (%) unless otherwise noted
*Includes Asian, American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, and those self-reported as "Other"

**Table 6. Psychiatric History and Prior AP Use**

| | No VMAT2 inhibitor with baseline AIMS score (N=438) |
|---|---|
| Previous psychiatric history | 435 (99.3) |
| Anxiety disorder | 149 (34.0) |
| Bipolar disorder | 153 (34.9) |
| Depression | 171 (39.0) |
| Schizoaffective disorder | 63 (14.4) |
| Schizophrenia | 172 (39.3) |
| Other | 134 (30.6) |
| Known prior AP use | 401 (91.6) |
| FGAs only | 25 (5.7) |
| SGAs and beyond only | 262 (59.8) |
| Both | 112 (25.6) |
| Years since first AP exposure, median | 12.2 |
| Prior or concomitant TD medications | 98 (22.4) |
| VMAT2 inhibitor* | 32 (7.3) |
| Other | 69 (15.8) |
| Formal TD diagnosis | |
| Yes | 177 (40.4) |
| No | 261 (59.6) |
| Concomitant TD treatment | 49 (11.2) |
| Years since first TD movements, median | 4.2 |

Values shown are n (%) unless otherwise noted
*Prior treatment only.

**Acknowledgments**
Medical writing and editorial support were provided by Holly Engelmann, PhD, and Kelly C. Wiggin, of AstheMed MedComms, an Inizio company, and were funded by Teva Branded Pharmaceutical Products R&D LLC.

**Disclosures**
This study was supported by Teva Branded Pharmaceutical Products R&D LLC. Stacy Finkbeiner, Martijn Konings, Mark Henegar, and Diana Klakotskaia are employees and/or shareholders of Teva Pharmaceuticals. Craig Chepke reports serving on advisory boards for AbbVie, Acadia, Alkermes, Axsome, Biogen, Bristol Myers Squibb, Certum, Eli Lilly, Idorsia, Intra-Cellular, Jazz, Johnson & Johnson, Lundbeck, Modernia, Neurocrine, Otsuka, Sage, Sunovions, Takeda, and Teva (spouse has served on advisory boards for Bristol Myers Squibb and Otsuka); consultancy for AbbVie, Acadia, Alkermes, Axsome, Biogen, Boehringer Ingelheim, Bristol Myers Squibb, Certum, Eli Lilly, Intra-Cellular, Johnson & Johnson, Lundbeck, Modernia, Neurocrine, Otsuka, Sage, Sunovions, Takeda, and Teva; and speaking for AbbVie, Acadia, Alkermes, Axsome, Biogen, Boehringer Ingelheim, Bristol Myers Squibb, Certum, Intra-Cellular, Jazz, Johnson & Johnson, Lundbeck, Luye, Merck, Neurocrine, Otsuka, Sunovions, Takeda, Tetraville, and Teva. Winona Tse is an investigator in the IMPACT-TD study.

**Abbreviations**
AIMS = Abnormal Involuntary Movement Scale, AP = antipsychotic, CliniRO = clinician-reported outcome, FGA = first-generation antipsychotic, SGA = second-generation antipsychotic, TD = tardive dyskinesia, VMAT2, vesicular monoamine transporter type 2.

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**Presented at the Annual Psych Congress; September 17–21, 2025; San Diego, CA.**