

# Tardive Dyskinesia: Assessment Using the Abnormal Involuntary Movement Scale (AIMS)



# [Presenters' names (Field Medical personnel) and Contact Info]

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# Overview of Tardive Dyskinesia



# DRBA-Induced Movement Disorders

- Dopamine Receptor Blocking Agent (DRBA)-induced movement disorders are associated with medications commonly used to manage psychiatric disorders, such as antipsychotics<sup>1,2</sup>
- Extrapyrimalidal Symptoms (EPS) is an obsolete umbrella term that has been used to describe a collection of DRBA-induced movement disorders despite each having a distinct pathophysiology, presentation, and treatment<sup>3</sup>
- Tardive dyskinesia (TD) is an often persistent, clinically distinct DRBA-induced movement disorder<sup>2,4</sup>
  - Can coexist with other DRBA-induced movement disorders<sup>4</sup>
  - Requires specific management<sup>4</sup>
- Understanding the differences between TD and other DRBA-induced movement disorders will aid in optimizing patients' treatment plans

1. Fahn S. Principles and Practice of Movement Disorders. 2nd ed. Elsevier Health Sciences; 2011. 2. American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*. Fifth Edition. American Psychiatric Association: Washington, DC; 2013. 3. Greenbaum L, et al. *Front Neurol*. 2015;6:27. 4. Van Harten PN, et al. *Schizophr Res*. 1997;26:235-242.





# Tardive Dyskinesia (TD) is Associated with Prolonged Exposure to Dopamine Receptor Blocking Agents (DRBAs)

## Tardive Dyskinesia

Defined as abnormal, involuntary movements of the tongue, jaw, trunk, or extremities that develop in association with medications that block post-synaptic dopamine receptors

### TD movements may be:\*

<b>Choreiform</b>	Rapid, jerky, nonrepetitive
<b>Athetoid</b>	Slow, sinuous, continual
<b>Semirhythmic</b>	E.g., stereotypies

### DRBAs can include:

- First-generation antipsychotics
- Second-generation antipsychotics
- Gastrointestinal medications, such as metoclopramide



\*Movements are distinctly different from the rhythmic tremors (3-6 Hz) commonly seen in drug-induced parkinsonism<sup>1</sup>

DRBA, dopamine receptor–blocking agent; TD, tardive dyskinesia; OBL, oral-buccal-lingual.

American Psychiatric Association: *Diagnostic and Stat Diagnostic and Statistical Manual of Mental Disorders*. Fifth Edition – Text Revision. American Psychiatric Association: Washington, DC; 2022



# Diagnosis of TD

- Healthcare providers use clinical evaluation and medical history to diagnose TD
- TD may appear in patients also experiencing other DRBA-induced movement disorders

## Movements must be present for at least:



4 weeks

## History of the offending agent for at least:



1 month in those 60 years and older



3 months in those younger than 60 years

## Signs of TD may develop:



During exposure to DRBA



Within 4 weeks of withdrawal from an oral DRBA\*



Within 8 weeks of withdrawal from LAI DRBA\*

\*Dyskinesia may remit with continued withdrawal. A diagnosis of TD may be warranted if the dyskinesia persists for at least 4 weeks.

DRBA, dopamine receptor–blocking agent; TD, tardive dyskinesia; LAI, long acting injectable.

American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition) Text Revision*. American Psychiatric Publishing; 2022.



# Conducting the AIMS

Step-by-step Instructions





# Screen All Patients Taking Antipsychotics at Each Visit

TD assessments should include regular clinical assessments and periodic assessments using a structured instrument (e.g., AIMS)<sup>1,2</sup>

## Clinical Assessments<sup>1,2</sup>



## Structured Assessments<sup>1</sup>



AIMS, Abnormal Involuntary Movement Scale; DRBA, dopamine receptor blocking agent; TD, tardive dyskinesia.

1. American Psychiatric Association. The American Psychiatric Association Practice Guidelines for the Treatment of Patients with Schizophrenia. American Psychiatric Association; 2021. 2. Caroff SN, et al. J Clin Psychiatry. 2020;81(2):19cs12983.



# Scoring AIMS

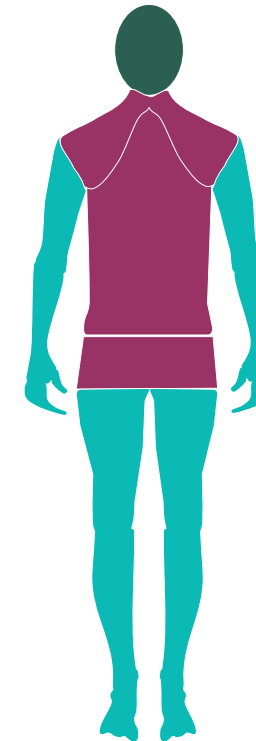
AIMS is a 12-item, clinician-rated scale used to assess TD severity

- It is a screening instrument and is not diagnostic

Facial and Oral Movements		None	Minimal	Mild	Moderate	Severe
1.	Muscles of facial expression	0	1	2	3	4
2.	Lips and perioral area	0	1	2	3	4
3.	Jaw	0	1	2	3	4
4.	Tongue	0	1	2	3	4
Extremity Movements		None	Minimal	Mild	Moderate	Severe
5.	Upper (arms, wrists, hands, fingers)	0	1	2	3	4
6.	Lower (legs, knees, ankles, toes)	0	1	2	3	4
Trunk Movements		None	Minimal	Mild	Moderate	Severe
7.	Neck, shoulders, hips	0	1	2	3	4

**AIMS Total Dyskinesia Score = Sum of Items 1–7**

- |    |                                       |        |               |
|----|---------------------------------------|--------|---------------|
| 8. | Global severity of abnormal movements | 10.    | Awareness     |
| 9. | Incapacitation                        | 11-12. | Dental Status |



AIMS Items 1-12

0=no dyskinesia; 1=low amplitude, present during some but not most of the exam; 2=low amplitude and present during most of the exam (or moderate amplitude and present during some of the exam); 3=moderate amplitude and present during most of exam; or 4=maximal amplitude and present during most of exam.

AIMS, Abnormal Involuntary Movement Scale; TD, tardive dyskinesia.

Guy W. *ECDEU Assessment Manual for Psychopharmacology*: Revised (DHEW publication number ADM 76-338). National Institute of Mental Health, Psychopharmacology Research Branch; 1976:534-537.



# AIMS Scoring Anchors

The descriptors in the table below are unique to the valbenazine clinical trials in adults with TD and include a more detailed explanation of how each severity level (0 to 4) is scored. The additional details include the amplitude and frequency of symptoms, which may help providers assess and assign an appropriate score for each body region.

Score	Anchor
0	No dyskinesia
1	Minimal or slight dyskinesia: low amplitude, present during some but not most of the exam
2	Mild dyskinesia: low amplitude and present during most of the exam (or moderate amplitude and present during some of the exam)
3	Moderate dyskinesia: moderate amplitude and present during most of exam
4	Severe: maximal amplitude and present during most of exam

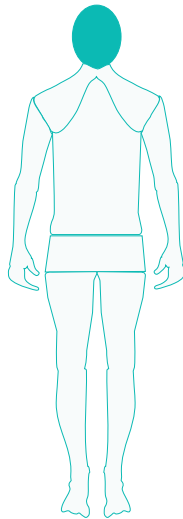
1. INGREZZA [package insert]. San Diego, CA: Neurocrine Biosciences, Inc. 2. Guy W. Abnormal Involuntary Movement Scale. *ECDEU Assessment Manual for Psychopharmacology*. 1976:534-537.



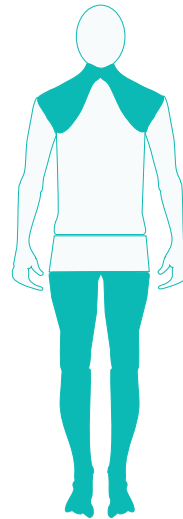
# Impact of AIMS Score on TD Presentation

- AIMS is not a linear scale
- Each total AIMS score can represent a range of clinical presentations **with varying impact on each individual**

## AIMS Score of 4



1 body region



2 body regions  
(each score a 2)



4 body regions  
(each score a 1)





# Prior to the AIMS Exam

## Prepare:

1. Examine the patient at rest to assess for movements in the waiting room and while walking to exam room.
2. Use a hard and firm chair that has no arms.
3. Ask patient to remove shoes and socks.
4. Be prepared to complete the entire exam before scoring it.

## Begin:

1. Ask the patient if there is anything in their mouth? i.e., gum or candy
2. Ask about the condition of their teeth. Do they wear dentures? Do they bother them?
3. Ask if they notice any movements of mouth, tongue, hands, or feet.
  - If yes, ask them to describe the movements.
  - Ask if movements interfere with activities of daily living or bother them.



# How to Conduct the AIMS Exam: Patient Posture

## Instructions:

- Have the patient sit in the chair with legs slightly apart and feet flat on the floor
- Ask the patient to sit with their hands hanging unsupported – either between their legs or hanging over their knees



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Guy W. ECDEU Assessment Manual for Psychopharmacology: Revised (DHEW publication number ADM 76-338). Rockville, MD; National Institute for Mental Health, Psychopharmacology Research Branch, 1976: 534-537.





# How to Conduct the AIMS Exam: Mouth Open

## Instructions:

- Ask the patient to hold their mouth open
  - Do this twice
  - *Observe tongue at rest inside mouth*



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Guy W. ECDEU Assessment Manual for Psychopharmacology: Revised (DHEW publication number ADM 76-338). Rockville, MD; National Institute for Mental Health, Psychopharmacology Research Branch, 1976: 534-537.



# How to Conduct the AIMS Exam: Tongue Protruded

## Instructions:

- Ask the patient to protrude their tongue
  - Do this twice
  - *Observe for abnormal tongue movements*



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Guy W. ECDEU Assessment Manual for Psychopharmacology: Revised (DHEW publication number ADM 76-338). Rockville, MD; National Institute for Mental Health, Psychopharmacology Research Branch, 1976: 534-537.



# How to Conduct the AIMS Exam: Finger Activation Maneuver

## Instructions:

- **Activation maneuver:** Ask the patient to tap their thumb to each finger as rapidly as possible for 15 seconds, one hand at a time
  - *Observe for uncovered facial or extremity movements*



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Guy W. ECDEU Assessment Manual for Psychopharmacology: Revised (DHEW publication number ADM 76-338). Rockville, MD; National Institute for Mental Health, Psychopharmacology Research Branch, 1976: 534-537.



# How to Conduct the AIMS Exam: Arm Flex/Extension

## Instructions:

- Flex and extend the patient's left and right arms, one at a time
  - *Note any rigidity (sign of parkinsonism)*



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# How to Conduct the AIMS Exam: Standing Arm Activation Maneuver

## Instructions:

- Ask the patient to stand up
  - *Observe the body in profile*
- **Activation maneuver:** Ask the patient to extend both arms out in front, palms down
  - *Observe trunk, legs, and mouth*



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Guy W. ECDEU Assessment Manual for Psychopharmacology: Revised (DHEW publication number ADM 76-338). Rockville, MD; National Institute for Mental Health, Psychopharmacology Research Branch, 1976: 534-537.



# How to Conduct the AIMS Exam: Walking Activation Maneuver

## Instructions:

- **Activation maneuver:** Have the patient walk a few paces, turn and walk back to the chair
  - *Observe hands and gait*



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Guy W. ECDEU Assessment Manual for Psychopharmacology: Revised (DHEW publication number ADM 76-338). Rockville, MD; National Institute for Mental Health, Psychopharmacology Research Branch, 1976: 534-537.





# Scoring the AIMS

Interactive Case Study



## Patient History

- Age 41
- Schizophrenia
- Current medications
  - Sertraline 100mg (since 2010)
  - Amlodipine
  - Omeprazole
  - Atorvastatin



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## Item 1: Face (Forehead, Eyebrows, Periorbital Area, Cheeks)



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# Item 1: Face (Forehead, Eyebrows, Periorbital Area, Cheeks)



**AIMS Item 1  
Score<sup>a</sup>: 1**



<sup>a</sup>The AIMS score was assessed by blinded central video raters in KINECT 4, a phase 3, open-label, long-term study of valbenazine in adults with tardive dyskinesia. These patients have consented to Neurocrine's use of their videos and protected health information.

## Item 2: Lips/Perioral Area

### Item 3: Jaw



**Activation maneuver:**  
patient asked to open  
mouth



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## Item 2: Lips/Perioral Area

### Item 3: Jaw



**Activation maneuver:**  
patient asked to open  
mouth

**AIMS Item 2 Score<sup>a</sup>: 1**  
**AIMS Item 3 Score<sup>a</sup>: 2**



<sup>a</sup>The AIMS score was assessed by blinded central video raters in KINECT 4, a phase 3, open-label, long-term study of valbenazine in adults with tardive dyskinesia. These patients have consented to Neurocrine's use of their videos and protected health information.



## Item 4: Tongue



**Activation maneuver:**  
patient asked to stick  
out tongue



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## Item 4: Tongue



**Activation maneuver:**  
patient asked to stick  
out tongue

**AIMS Item 4 Score<sup>a</sup>: 1**



<sup>a</sup>The AIMS score was assessed by blinded central video raters in KINECT 4, a phase 3, open-label, long-term study of valbenazine in adults with tardive dyskinesia. These patients have consented to Neurocrine's use of their videos and protected health information.



## Item 5: Upper Extremities (Arms, wrists, hands, fingers)



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## Item 5: Upper Extremities (Arms, wrists, hands, fingers)



**AIMS Item 5 Score<sup>a</sup>: 2**

<sup>a</sup>The AIMS score was assessed by blinded central video raters in KINECT 4, a phase 3, open-label, long-term study of valbenazine in adults with tardive dyskinesia. These patients have consented to Neurocrine's use of their videos and protected health information.



## Item 6: Lower Extremities (Legs, knees, ankles, toes)



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## Item 6: Lower Extremities (Legs, knees, ankles, toes)

**AIMS Item 6 Score<sup>a</sup>: 2**



<sup>a</sup>The AIMS score was assessed by blinded central video raters in KINECT 4, a phase 3, open-label, long-term study of valbenazine in adults with tardive dyskinesia. These patients have consented to Neurocrine's use of their videos and protected health information.



## Item 7: Trunk (Neck, shoulders, hips)



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## Item 7: Trunk (Neck, shoulders, hips)



**AIMS Item 7 Score<sup>a</sup>: 1**

<sup>a</sup>The AIMS score was assessed by blinded central video raters in KINECT 4, a phase 3, open-label, long-term study of valbenazine in adults with tardive dyskinesia. These patients have consented to Neurocrine's use of their videos and protected health information.

# Patient Case Summary



These patients have consented to Neurocrine's use of their videos and protected health information.



# Patient Case Summary

- These movements are consistent with tardive dyskinesia

## Facial and Oral Movements:

- Intermittent, low amplitude, lip pursing and pouting
- Movements of lips may be more noticeable when asked to keep mouth open
- Intermittent, low amplitude, athetoid movement of the tongue

## Extremity Movements:

- Bilateral, involuntary, and irregular movements of fingers
- Flaring of great toe and inversion of feet at rest and during activation

AIMS Total Dyskinesia Score <sup>a</sup> (Sum of Items 1-7) = 10					
Facial and Oral Movements	None	Minimal	Mild	Moderate	Severe
1. Muscles of facial expression	0	1	2	3	4
2. Lips and perioral area	0	1	2	3	4
3. Jaw	0	1	2	3	4
4. Tongue	0	1	2	3	4
Extremity Movements	None	Minimal	Mild	Moderate	Severe
5. Upper (arms, wrists, hands, fingers)	0	1	2	3	4
6. Lower (legs, knees, ankles, toes)	0	1	2	3	4
Trunk Movements	None	Minimal	Mild	Moderate	Severe
7. Neck, shoulders, hips	0	1	2	3	4
8. Global severity of abnormal movements			10. Awareness		
9. Incapacitation			11-12. Dental Status		

<sup>a</sup>The AIMS score was assessed by blinded central video raters in KINECT 4, a phase 3, open-label, long-term study of valbenazine in adults with tardive dyskinesia. AIMS, Abnormal Involuntary Movement Scale; TD, tardive dyskinesia.



# **TD Treatment Recommendations**



## 2020 APA Guideline: TD Recommendations

Reversible VMAT2 inhibitors are recommended in patients with moderate to severe or disabling TD

VMAT2 inhibitors can also be considered for patients with mild TD

There is insufficient evidence to support a guideline statement on the use of the following treatments in individuals with TD:

Anticholinergics (e.g., benztropine)

Benzodiazepines (e.g., clonazepam)

Change in antipsychotic therapy to a lower-potency medication

Ginkgo biloba

Cessation or reduction of antipsychotic medication

Amantadine

Vitamin E



## Key Takeaways

- The Abnormal Involuntary Movement Scale (AIMS) is used to evaluate dyskinetic movements of patients on antipsychotics or other DRBAs<sup>1</sup>
  - TD is an often persistent, clinically distinct DRBA-induced movement disorder that requires specific management<sup>2,3</sup>
  - The use of EPS as an umbrella term is considered obsolete and potentially clinically problematic<sup>4</sup>
- Regular assessment of TD severity (e.g., via AIMS) at least every 6-12 months is recommended<sup>5</sup>
  - Impact of TD on patient function and quality of life should also be assessed
- There are two FDA-approved VMAT2 inhibitors recommended as first-line treatment of TD<sup>5</sup>

TD, tardive dyskinesia; DRBA, dopamine receptor blocking agent; VMAT2, vesicular monoamine inhibitor 2.

1. Guy W. ECDEU Assessment Manual for Psychopharmacology: Revised (DHEW publication number ADM 76-338). Rockville, MD; National Institute for Mental Health, Psychopharmacology Research Branch, 1976: 534-537. 2. American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*. Fifth Edition. American Psychiatric Association: Washington, DC; 2013. 3. Van Harten PN, et al. *Schizophr Res*. 1997;26:235-242. 4. Greenbaum L, et al. *Front Neurol*. 2015;6:27. 5. American Psychiatric Association. Clinical Practice Guidelines for Treatment of Patients with Schizophrenia. Accessed on November 8, 2020.

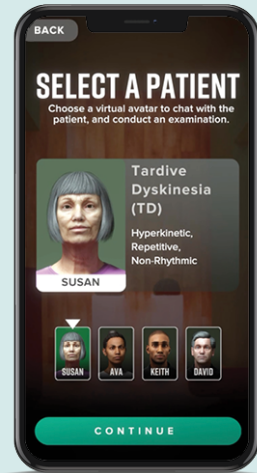


# FREE EDUCATIONAL RESOURCES on Tardive Dyskinesia and Other Drug-Induced Movement Disorders

These educational resources were sponsored and developed by Neurocrine Biosciences, Inc.

## Discover TD®

**Discover TD®** is an interactive experience designed to inform health care providers about tardive dyskinesia and other drug-induced movement disorders. By interacting with hypothetical virtual patients, you can diagnose and determine an appropriate management plan.<sup>a</sup>



<sup>a</sup>For educational purposes only. Should not be interpreted as medical advice for any particular patient. Individual results may vary.

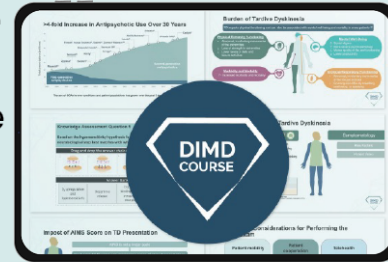
Experience  
Discover TD®

[mind-td.com/discover-td](http://mind-td.com/discover-td)



## DIMD Course

The **DIMD Course** is a free, virtual learning resource for health care providers that delves into various clinical aspects of the most common DRBA-induced movement disorders.



Join the  
DIMD Course

[dimdcourse.getlearnworlds.com](http://dimdcourse.getlearnworlds.com)



## Neurocrine Medical Website

The **Neurocrine Medical Website** houses a variety of resources, such as educational podcasts and videos, to assist healthcare providers in the recognition and appropriate differentiation of DRBA-induced movement disorders.



Visit the  
Neurocrine Medical Website

[neurocrinemedical.com](http://neurocrinemedical.com)



DIMD, drug-induced movement disorder; DRBA, dopamine receptor-blocking agent; TD, tardive dyskinesia.



Neurocrine Medical Affairs

[www.neurocrinemedical.com](http://www.neurocrinemedical.com)



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# Appendix



# Scoring AIMS: Items 1-12

AIMS is a 12-item, clinician-rated scale used to assess TD severity

Facial and Oral Movements		None	Minimal	Mild	Moderate	Severe
1.	Muscles of facial expression	0	1	2	3	4
2.	Lips and perioral area	0	1	2	3	4
3.	Jaw	0	1	2	3	4
4.	Tongue	0	1	2	3	4
Extremity Movements		None	Minimal	Mild	Moderate	Severe
5.	Upper (arms, wrists, hands, fingers)	0	1	2	3	4
6.	Lower (legs, knees, ankles, toes)	0	1	2	3	4
Trunk Movements		None	Minimal	Mild	Moderate	Severe
7.	Neck, shoulders, hips	0	1	2	3	4
Global Judgements		None	Minimal	Mild	Moderate	Severe
8.	Overall severity	0	1	2	3	4
9.	Incapacitation	0	1	2	3	4
10.	Patient's awareness*	0	1	2	3	4
Dental Status		No	Yes			
11.	Current problems with teeth/dentures?	0	1			
12.	Denture use?	0	1			

\*0=no awareness; 1=aware, no distress; 2=aware, mild distress; 3=aware, moderate distress; or 4=aware, severe distress.

AIMS, Abnormal Involuntary Movement Scale; TD, tardive dyskinesia.

Guy W. *ECDEU Assessment Manual for Psychopharmacology*: Revised (DHEW publication number ADM 76-338). National Institute of Mental Health, Psychopharmacology Research Branch; 1976:534-537.



# Patient Videos

TD by Body Region





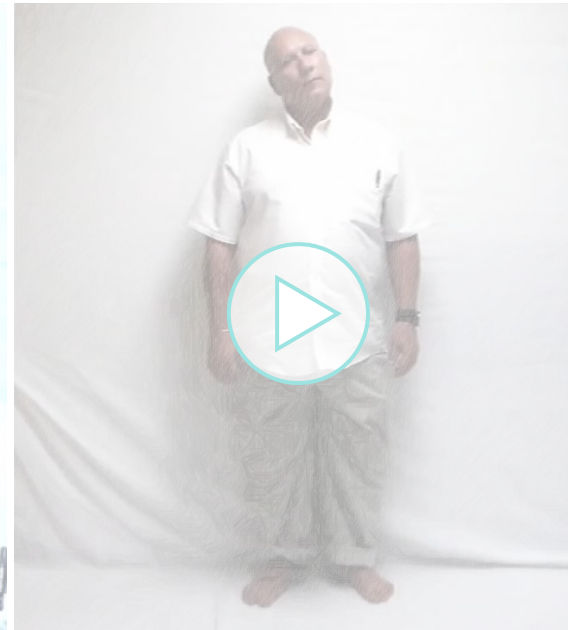
**Moderate  
Cervical & Jaw**



**Open Mouth  
& Tongue**



**Neck, Shoulder, Hands  
(Standing and Walking)**



These patients have consented to Neurocrine's use of their videos and protected health information.

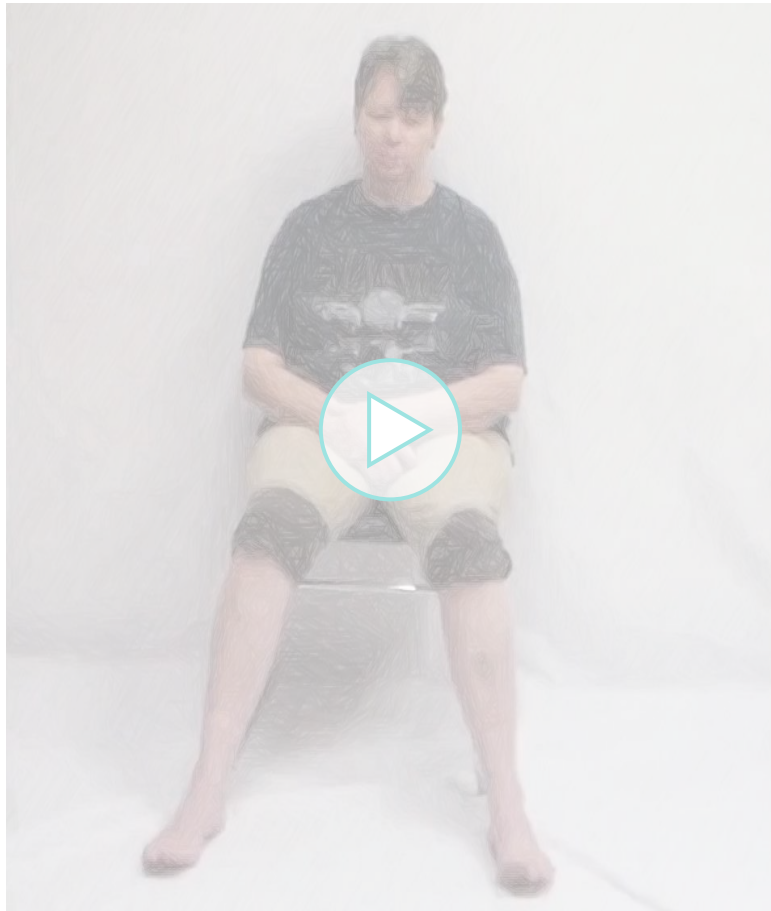




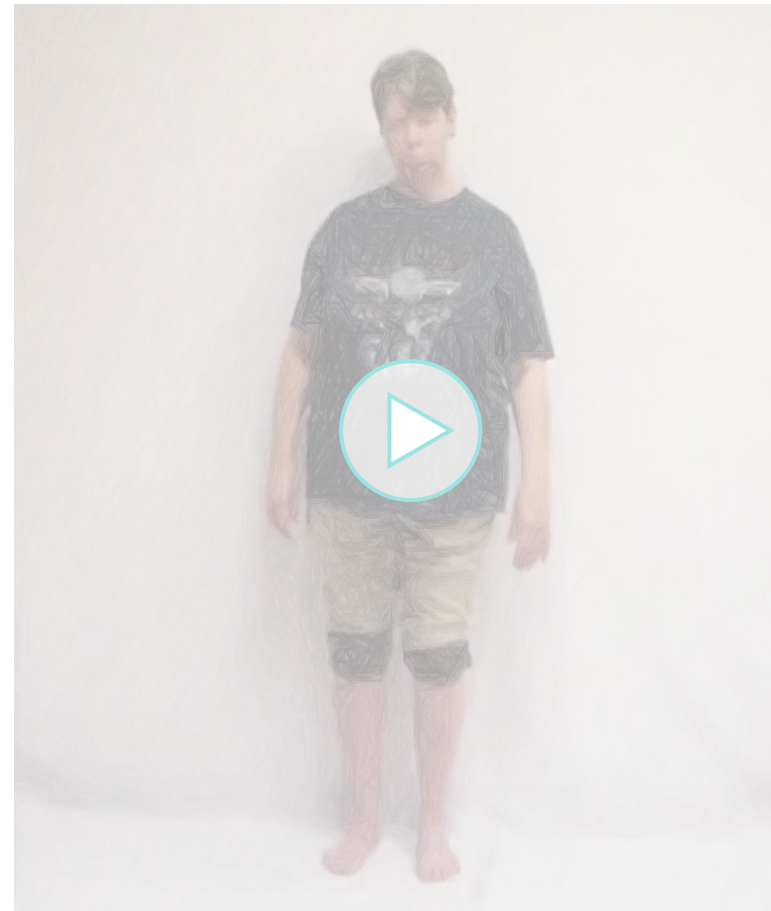
## Oral-Buccal-Lingual and Legs



Sitting



Standing



These patients have consented to Neurocrine's use of their videos and protected health information.



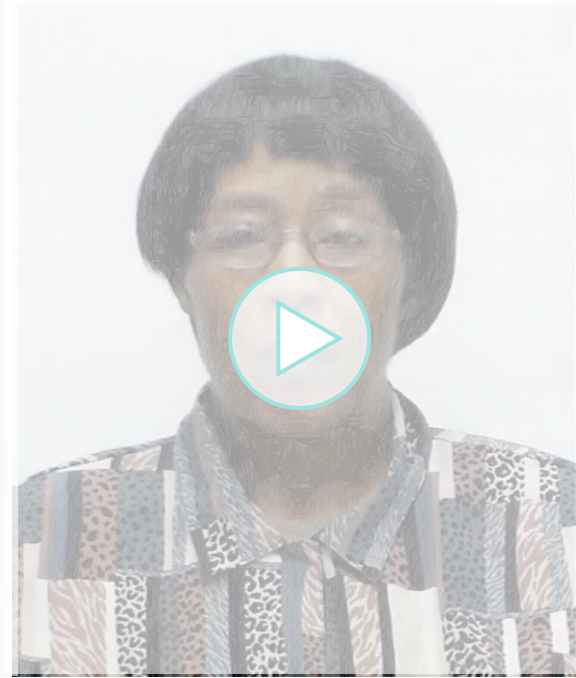
**Mild Jaw  
and Hand**



**Activation  
With Hand Movement**



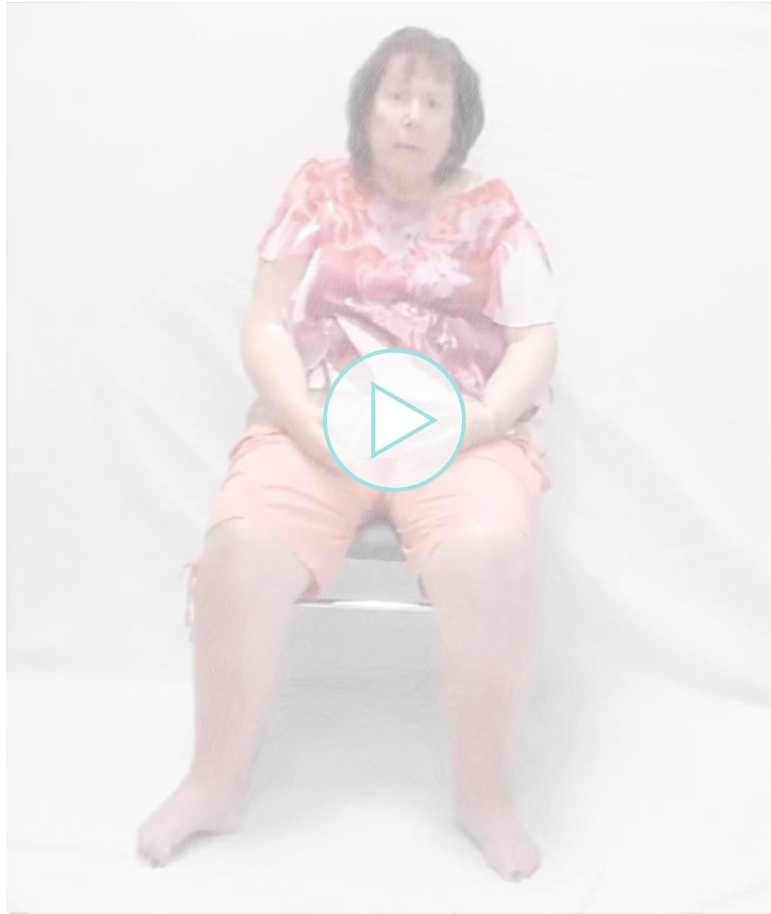
**Increased Blinking and  
Jaw Activation**



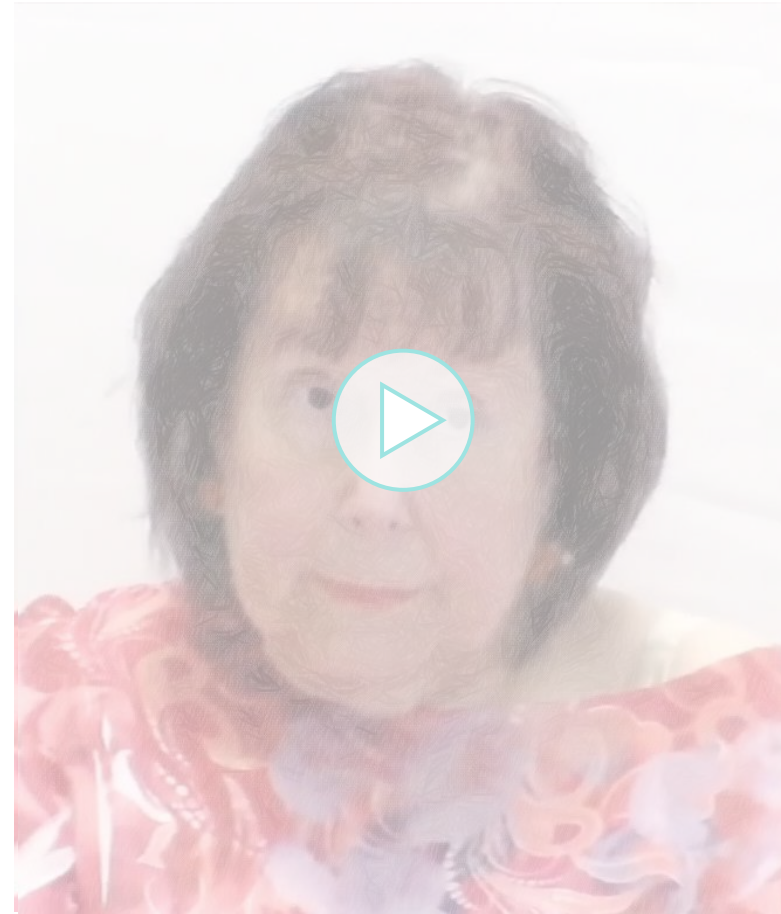
These patients have consented to Neurocrine's use of their videos and protected health information.



## Leg and Shoulder Dyskinesia



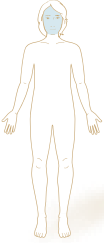
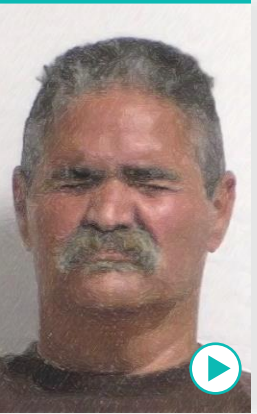
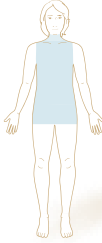
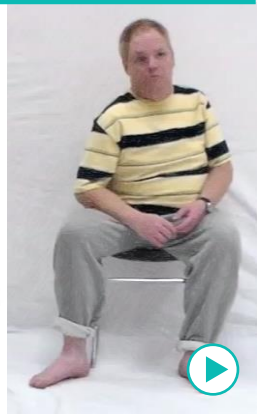
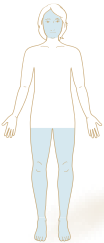

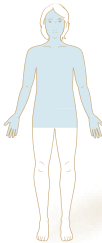
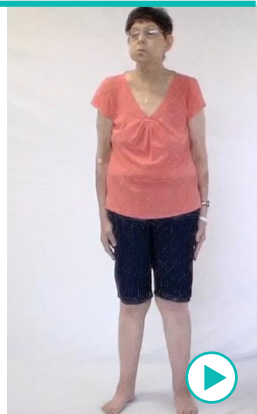
## Facial Grimacing and Head Nodding



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# Impact of AIMS Score on TD Presentation

Each total AIMS score can represent a range of clinical presentations

<p><b>Scores of four (1 AIMS item)</b></p> <p><b>FACIAL REGION</b></p> 		<p><b>Scores of four (1 AIMS item)</b></p> <p><b>TRUNK</b></p> 	
<p><b>Scores of two (Multiple AIMS items)</b></p> <p><b>LIPS</b></p> <p><b>LOWER EXTREMITIES</b></p> 		<p><b>Scores of one (4 AIMS items)</b></p> <p><b>FACIAL REGION</b></p> <p><b>LIPS</b> <b>TRUNK</b></p> <p><b>UPPER EXTREMITIES</b></p> 	

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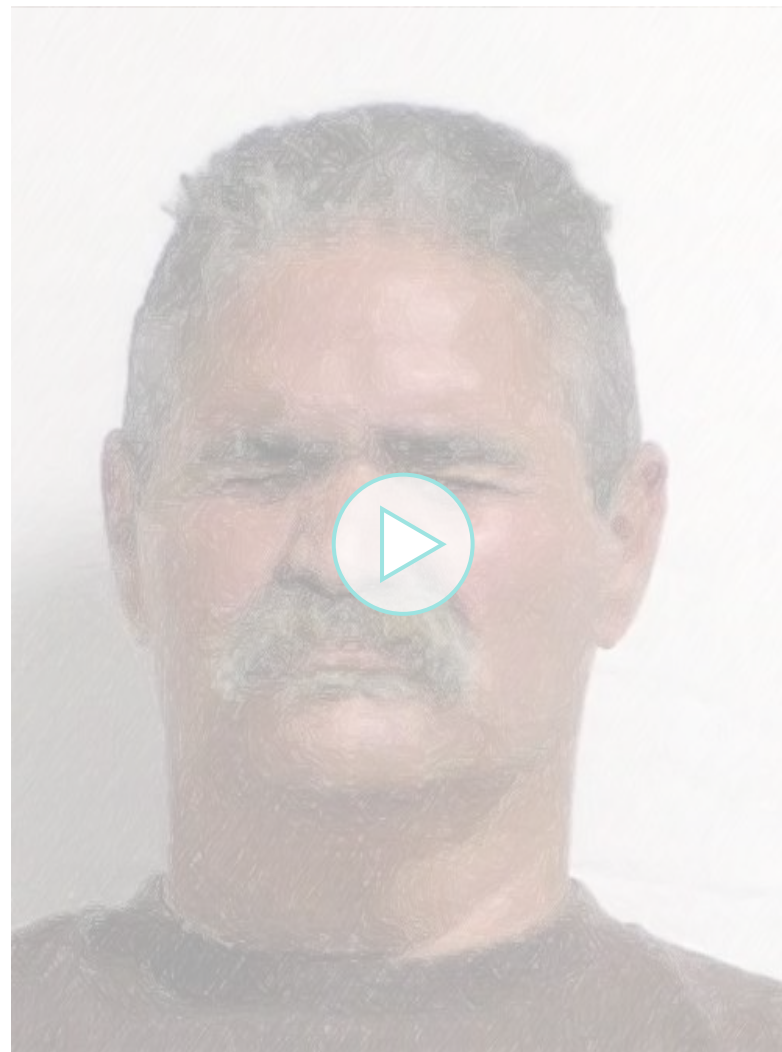
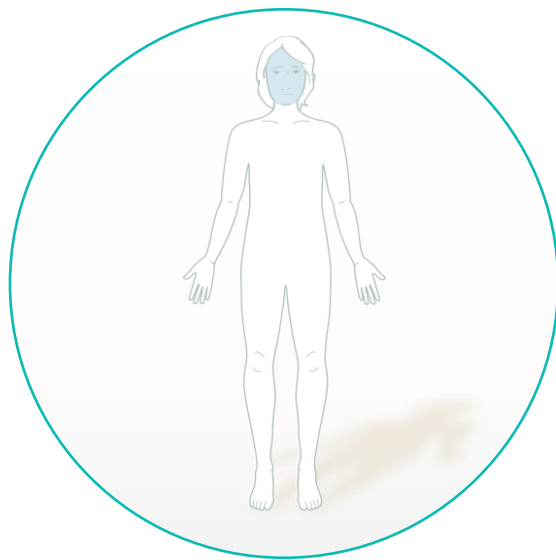
AIMS, Abnormal Involuntary Movement Scale.

Guy W. *ECDEU Assessment Manual for Psychopharmacology*. Revised (DHEW publication number ADM 76-338). National Institute of Mental Health, Psychopharmacology Research Branch; 1976:534-537.



**Score of four  
(1 AIMS Item)**

**FACIAL REGION**



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**Score of four  
(1 AIMS Item)**

TRUNK

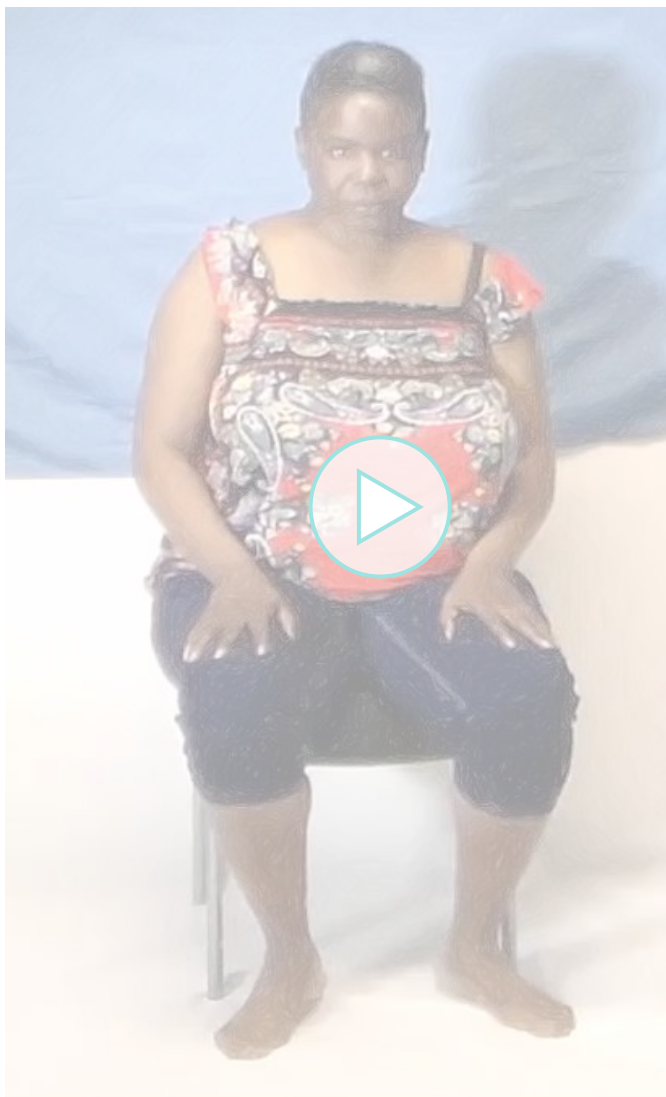
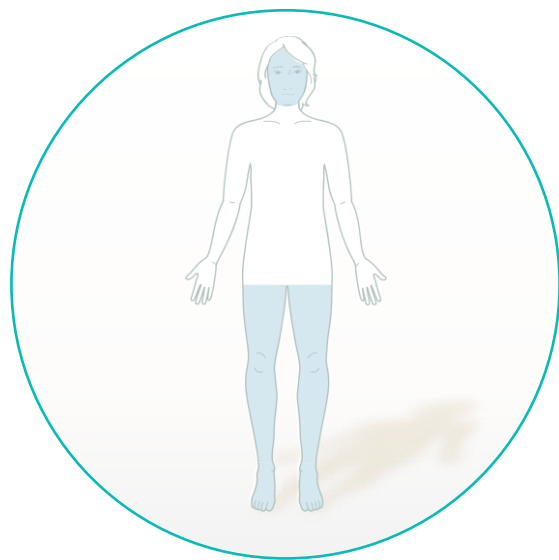




## Score of two (2 AIMS Items)

LIPS

LOWER EXTREMITIES





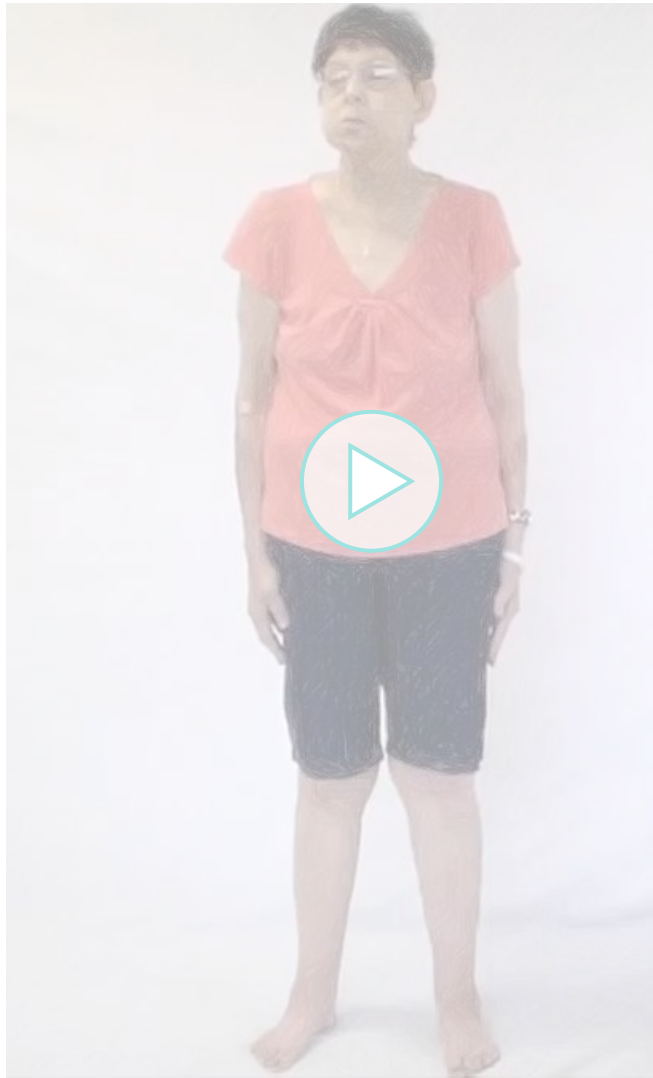
## Score of one (4 AIMS Items)

FACIAL REGION

LIPS

UPPER EXTREMITIES

TRUNK/NECK



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