



# DISORDERED BRAINS AND EXERCISE:

WELCOMING PEOPLE WITH **UNRULY** BODIES INTO FITNESS

Lisa Gombinsky Roach  
Counterpunch Parkinson's



# PART 1: THE BRAIN AND MOTOR FUNCTION / DYSFUNCTION

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# TODAY WE WILL BE COVERING

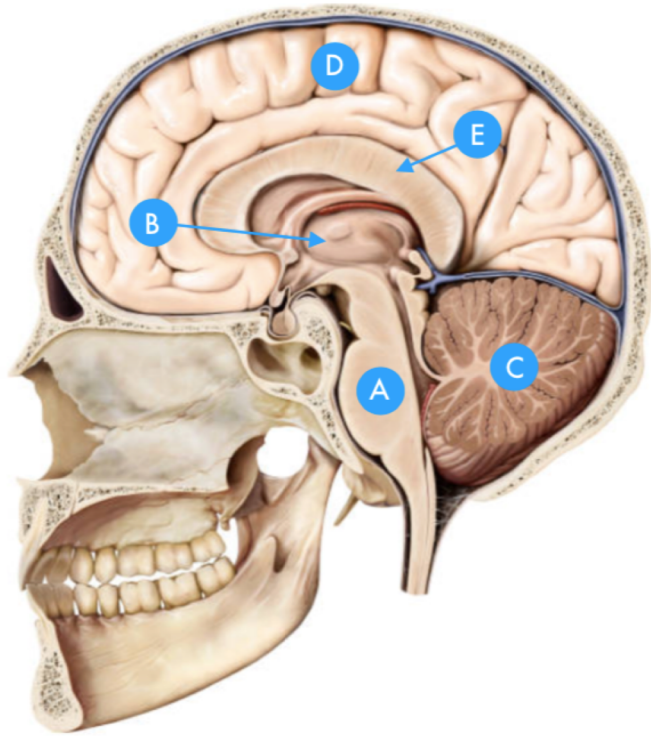
## Part 1

- The brain and control of movement
- The brain and abnormal movement

## Part 2

- Overview – the most common motor disorders
- Exercise guidelines and contraindications for these conditions
- key concepts and strategies for helping people with these conditions move better

# THE BRAIN AND MOTOR CONTROL



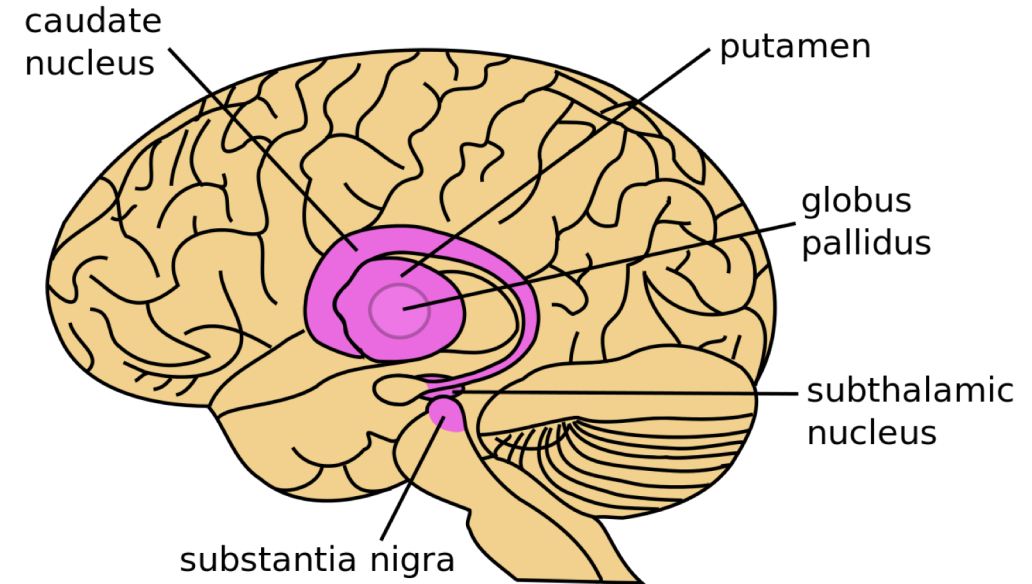
[A] Brain stem, [B] Thalamus, [C] Cerebellum,  
[D] Motor Cortex, [E] Basal Ganglia

- Motor cortex
- Cerebellum
- Basal Ganglia
- Thalamus
- Brainstem
- Spine
- Motor and Sensory Nerves

# THE COMMANDER IN CHIEF

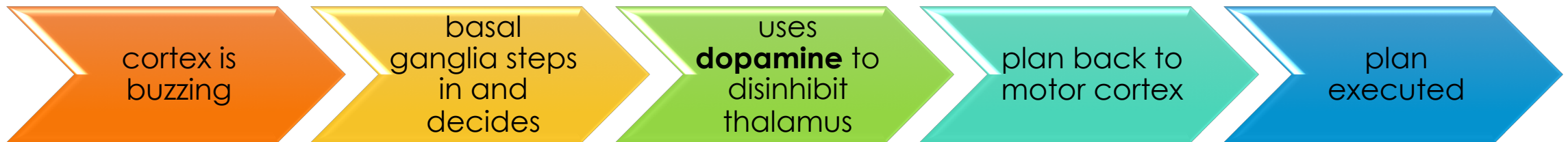
## Meet the Basal Ganglia

- Responsible for starting and stopping movement – or more correctly, *'initiating and inhibiting'* movement
- Responsible for controlling movement, or selecting motor plan to be executed
- Works via neurotransmitter mediated feedback loops



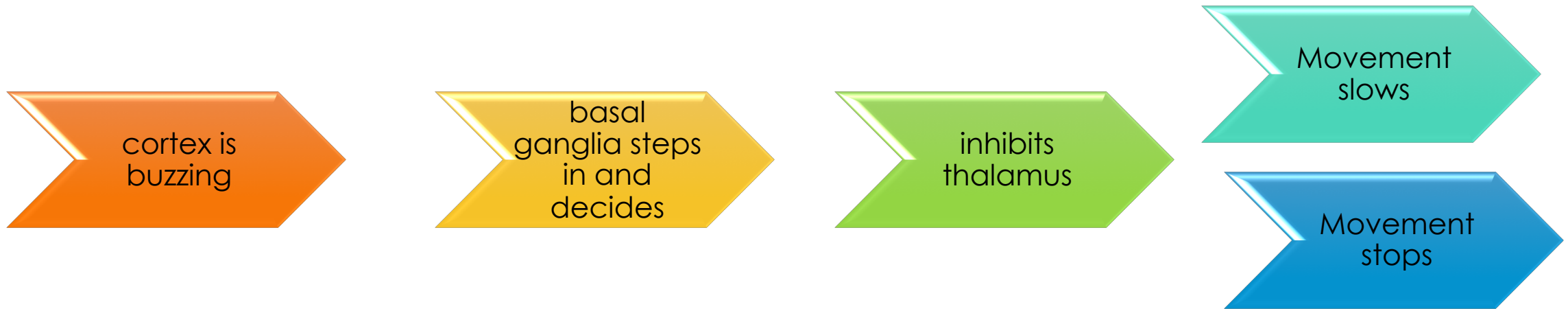


# THE DIRECT PATHWAY – MOVE!!



Movement is initiated by the basal ganglia *'taking the foot off of the brakes'* of a particular motor plan via the direct pathway

# THE INDIRECT PATHWAY – STOP!!



Movement is inhibited by the basal ganglia '*maintaining or increasing the pressure applied to the brakes*' of a particular motor plan via the indirect pathway

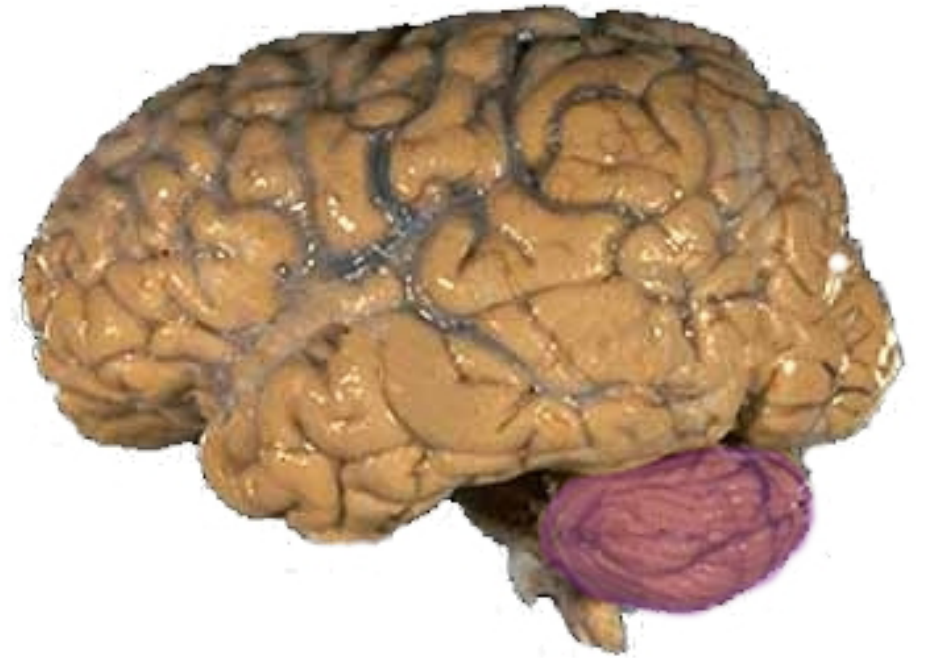
# QUALITY CONTROL

## The Cerebellum

**In neurotypical folk...**



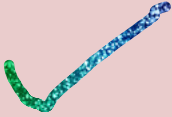





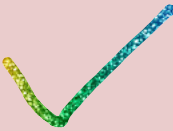


**when is the cerebellum  
at it's best?**

**when is it at it's worst?**





# OVERVIEW OF MOTOR DYSFUNCTION

	Brainstem	Basal ganglia	Cerebral cortex	Cerebellum,	Motor nerves	spine
Spasticity / weakness						
paralysis						
Dystonia / dyskinesia						
ataxia						
Autonomic dysfunction						
Neuropathy						

# GETTING A GRIP ON THE LINGO

spasticity

paralysis

dystonia

dyskinesia /  
athetosis

the 'plegias'

hyper/hypotone

ataxia

# OVERVIEW: MOTOR DISORDER

	Multiple sclerosis	Parkinson's	Stroke	Cerebral Palsy	Ataxia	Brain Injury	Spinal Injury
When does it present?							
Is it degenerative							
What is the cause?							
Where in the brain / spine?							
What does it look like?							
Exercise guidelines							





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# PART 2: MS, PD, CVA, CP AND EXERCISE

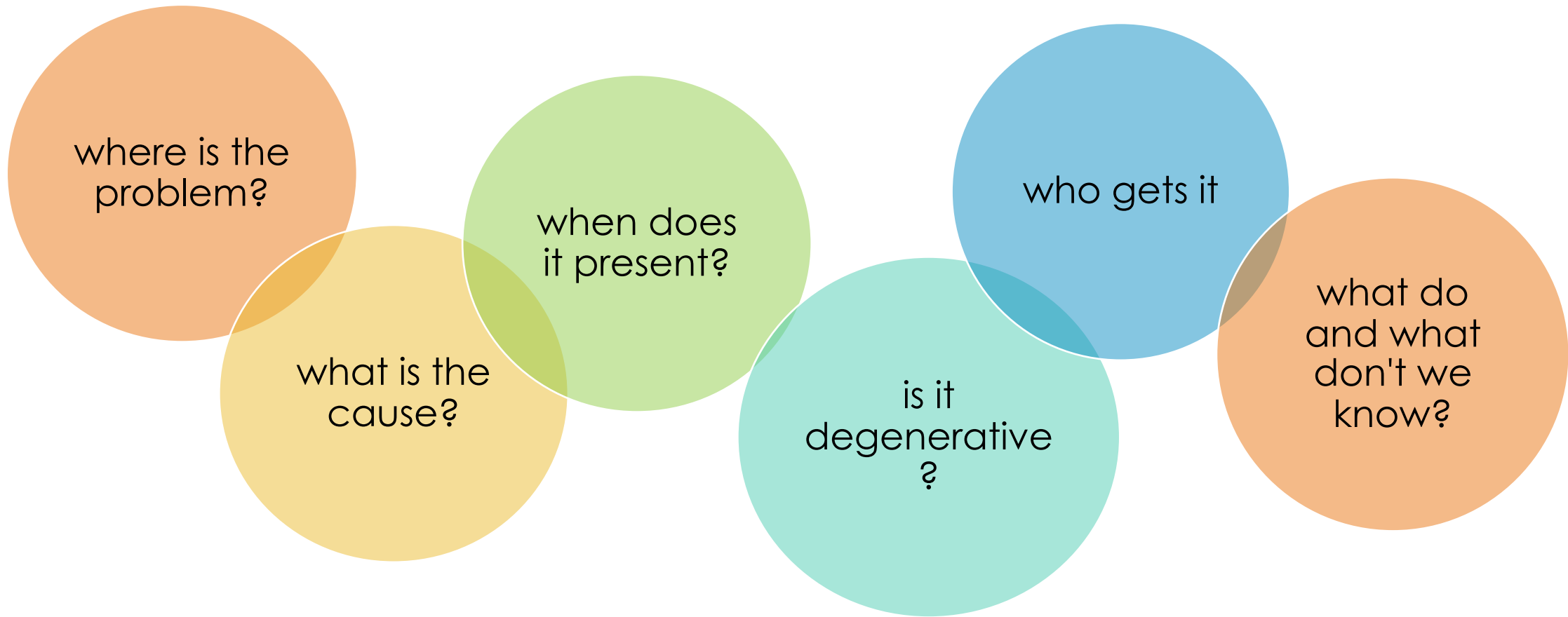
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# OVERVIEW: MOTOR DISORDER

	Multiple sclerosis	Parkinson's	Stroke	Cerebral Palsy	Ataxia	Brain Injury	Spinal Injury
When does it present?							
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Where in the brain / spine?							
What does it look like?							
Exercise guidelines							



# MULTIPLE SCLEROSIS (MS)

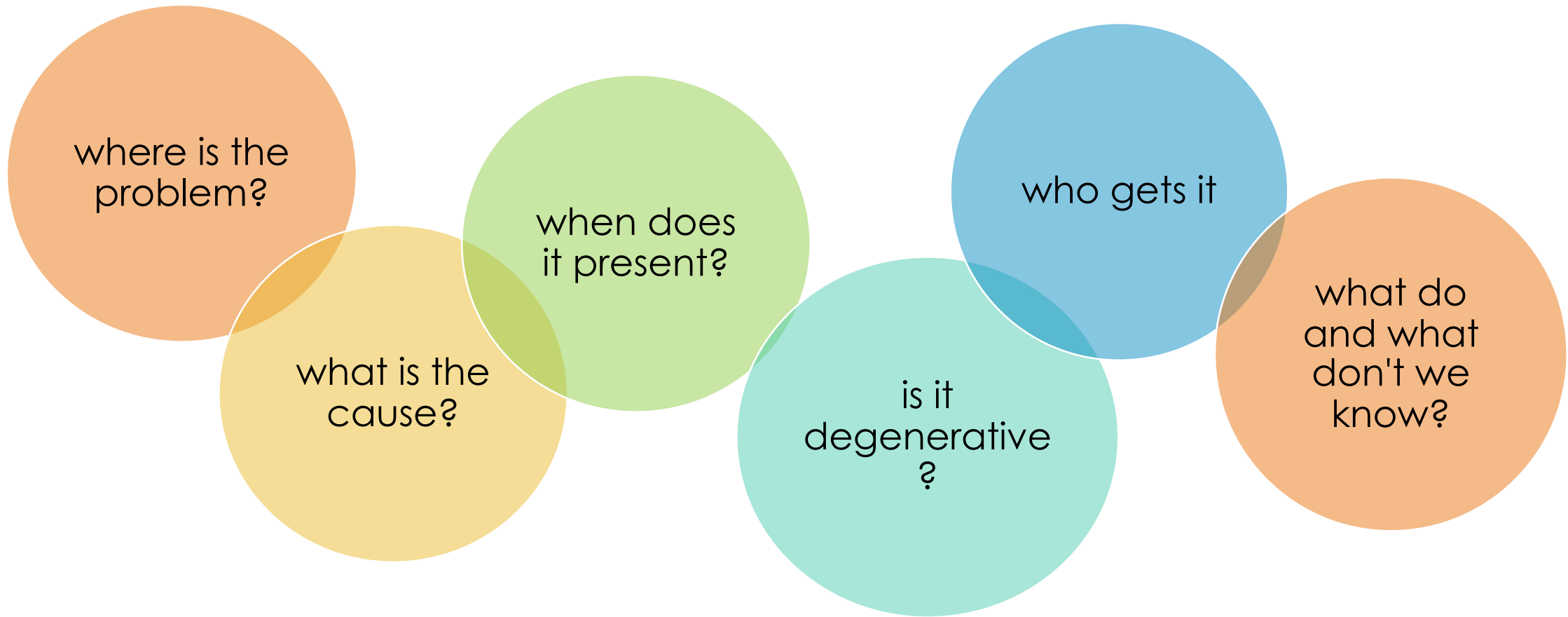




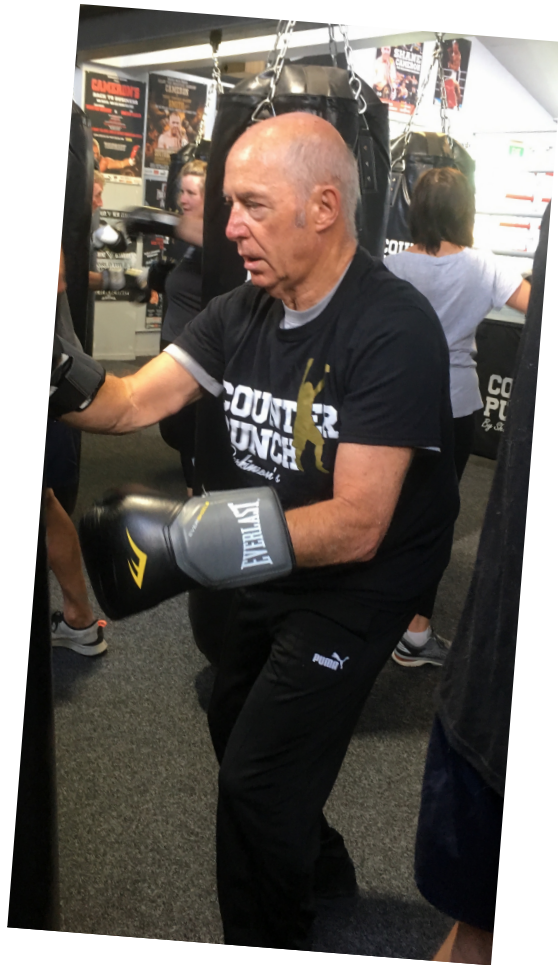
# MULTIPLE SCLEROSIS AND EXERCISE

- Photos of clients

# PARKINSON'S DISEASE



# PARKINSON'S AND EXERCISE





# STROKE (CVA)

where is the  
problem?

when does  
it present?

who gets it

what is the  
cause?

is it  
degenerative  
?

what do  
and what  
don't we  
know?



# A STROKE IS A BRAIN ATTACK



**FACE**  
DROOPING



**ARM**  
WEAKNESS



**SPEECH**  
DIFFICULTY



**TAKE ACTION**  
**CALL 111**



# STROKE AND EXERCISE

- Photos of clients

# CEREBRAL PALSY

where is the  
problem?

when does  
it present?

who gets it

what is the  
cause?

is it  
degenerative  
?

what do  
and what  
don't we  
know?



# CEREBRAL PALSY AND EXERCISE

Photos of clients

# REVIEW MOTOR DISORDERS

	Multiple sclerosis	Parkinson's	Stroke	Cerebral Palsy
When does it present	Usually young adult	Usually older adulthood	Usually older adulthood	In utero or first 2 years
Is it degenerative	yes	yes	no	no
What is the cause	Autoimmune,	Idiopathic	Vascular / aneurism	Insult or injury
Where in the brain / spine	White matter, nerves	Basal ganglia	Usually motor cortex	Any or multiple sites
What does it look like	Depends on what nerves	Tremor bradykinesia	Usually hemiplegia	Depends where injury
Exercise guidelines	Do it	Train	Ease back in	Not fragile

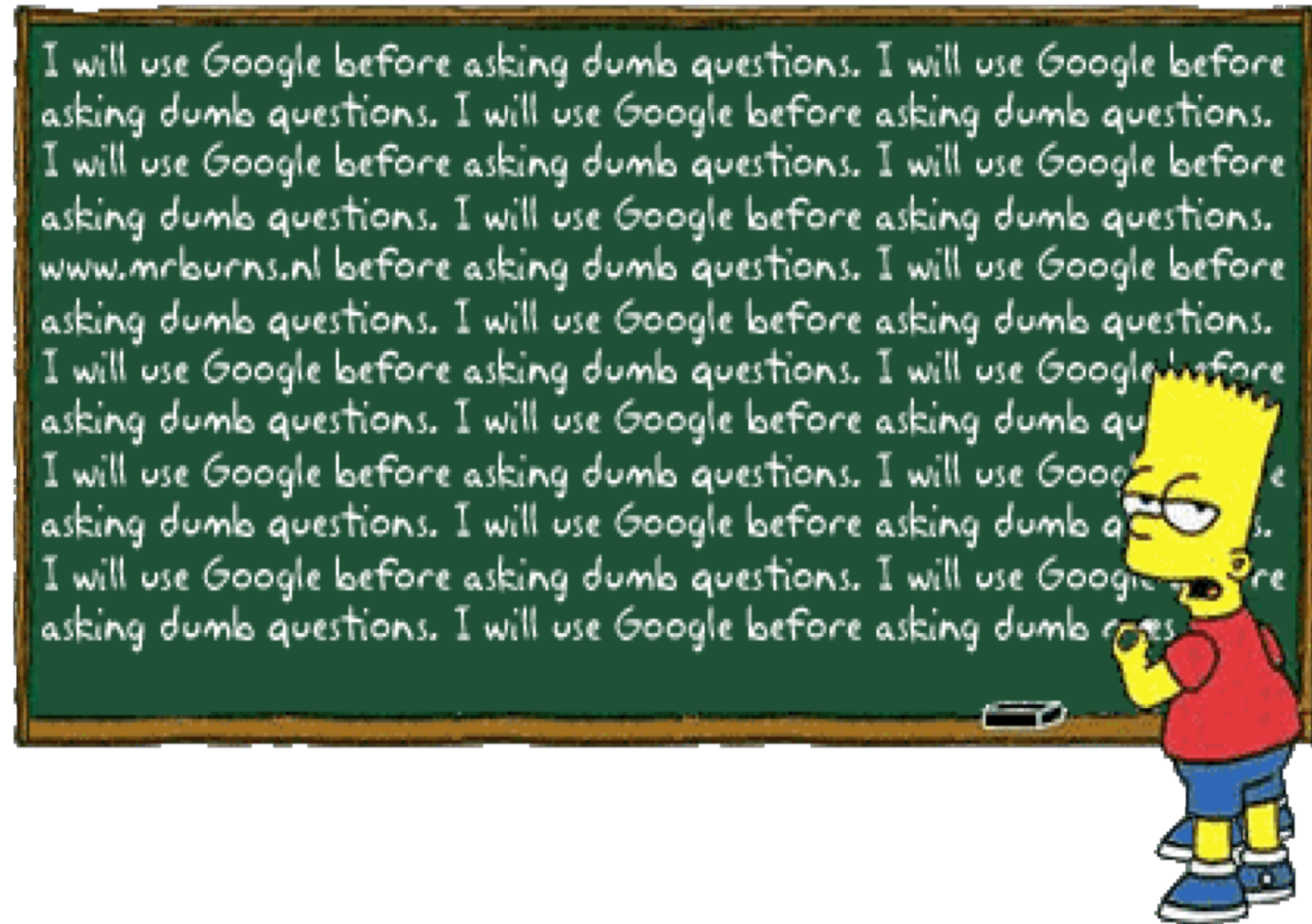


# KEY CONCEPTS AND STRATEGIES

- Train into the deficit
- Promote / maintain / improve functional mobility and functional independence – without making it feel like therapy
- Empowering – active vs passive
- Dignity of risk, dignity in general
- Zone of next potential – pay attention to your expectations
- Meet people where they are – respect individuals goals, starting point, preferences, exercise history
- Don't forget to make it fun, engaging, personal, motivational
- We are all temporarily able bodied
- Embrace the chaos that they bring – but help provide order and security

# HAVE YOU GOT ALL THAT??

- You don't need to be an expert!!  
Often the experts aren't even experts!
- Be openminded, creative, and work with individuals as individuals
- Focus on solutions and idea – not on problems
- Be prepared for things not to always go according to plan
- Make mistakes and move on, keep learning



# DISORDERED BRAINS AND EXERCISE

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**Safe, Fun, Effective Exercise for People with UNRULY Bodies**

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