

# Primitive Reflex Integration for Concussion — A New Use for an Old Technique

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## Learning Objectives

- Demonstrate intermediate-level knowledge of primitive reflexes and their role in the concussed population
- Demonstrate a functional understanding of vertical integration and the impact disruption can cause
- Provide accurate and effective patient education for rehab purpose and home exercise program instruction
- Effectively perform and interpret results from the Primitive Reflex Screening Tool
- Effectively implement the Primitive Reflex Integration treatment protocol



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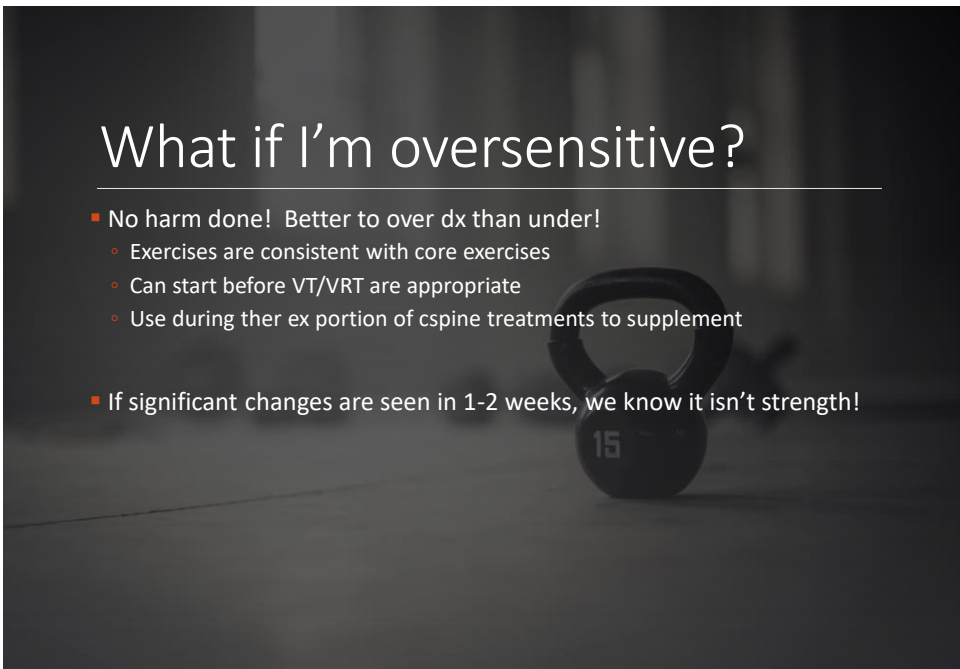


## How to Fix Disinhibited Reflexes??

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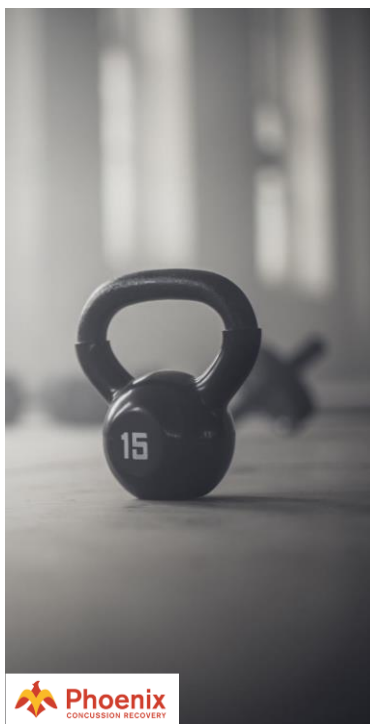
## What if I'm oversensitive?

- No harm done! Better to over dx than under!
  - Exercises are consistent with core exercises
  - Can start before VT/VRT are appropriate
  - Use during their ex portion of cspine treatments to supplement
- If significant changes are seen in 1-2 weeks, we know it isn't strength!

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## Keys to Integration Exercises

- Daily exercise with most at 2x10
  - Instructed to decrease repetitions or complete in sections if severe increase symptoms.
  - Goal is to **FATIGUE** the reflex!
- Slow and purposeful
  - Have someone watch them at home!
  - Quality over quantity
- Exercises must be done **exactly** as prescribed
- Progress to Level 2 as tolerated

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## Troubleshooting

Educate each patient on the potential for emotional response.

Primarily irritability and agitation, can be an emotionless cry

- If occurs, they should push UP TO the point of symptoms

More chronic patients may have increased headaches, dizziness, visual changes

- Progress them more slowly!

Young kids are more prone to irritability with the exercises, start them slower



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# Findings

- 4-6 week average for integration
- **Outliers:**
  - Non-compliant (#1)
  - Severe TBI
  - Children with retained reflexes with increase post concussion
  - Often require increased rehabilitation to fully integrate
  - Incorporate postural reflex positions to vision and vestibular ex



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## Exercise Protocol

### LEVEL 1

- Bridge
- Superman, swimmer
- Cat/camel, Bird Dog
- Snow angel
- Marching Zombie

### LEVEL 2


- Pigeon, duck
- Deadbug
- Starfish
- Slap tap
- Archer
- Robot



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Bridge

SLOW – up for 3, pause, down for 3  
 High as you can  
 Keep the feet, knees, palms together  
 No wiggle or sway  
 2x10




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Level 1 – Moro

Bridge – as seen in screen  
 ◦ Progress – ADD squeeze



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# Snow Angel

SLOW – 5 seconds up, pause, 5 seconds down – don't rush the down

Just to a Y

Get to the top and bottom at the exact same time

Smooth and controlled

No thinking required – “until it clicks”

2x10

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# Galant

Snow Angel



Jumping Jack – often hold due to post concussive state



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## Cat/Camel – N/A for BPPV, cspine pain

The entire body stays still – no AP or lateral sway, no fidgety feet

Only move through a pain free range – flexion is more important than extension

Use when BPPV is not present, if habituation is a key priority, if bird dog is not safe due to level of impairment

SLOW movement – hold for 3 in flexion, hold for 3 in slight extension

2x10



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Hands and knees – stable position – knees do not need to touch

Put a book on your back – keep the back flat

Don't weight shift over – "think weight even between knee and hand"

- They can't feel the postural shift!

Move slowly and diligently – no timed goal

Just pause at the top

Knee straight

Straight extension – no ABD

2x10 PER side

## Bird Dog – typical 1<sup>st</sup> exercise



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# Level 1 STNR

Cat / Camel

Bird Dog



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# Superman

- HEAD DOWN – primary concern
- Knees and elbows straight – they can't feel them flex – "straighten each rep"
- Hold for 5 seconds – no bounce or wiggle
- Feet don't touch each other
- Until not effortful, no symptoms – typically most provocative
- Breathe!
- Does not matter how high they lift – modify for LBP
- 2x10



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## TLR

Superman



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## Swimmer

HEAD DOWN

Elbows and knees straight – “check each rep”

Don’t push down on the other side

Only lift 1-2 inches – limits rotation due to ROM restrictions

Hold 3 seconds, pause between sides

No bounce or wiggle

Not effortful or provocative, breathe

2x10 EACH side

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# TLR

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Swimmer



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Arms up shoulder width / height – don't hike the shoulders!

Keep the arms stiff / still / straight

Don't let the knee cross midline

Good postural control

1x per side x 60sec

# Zombie

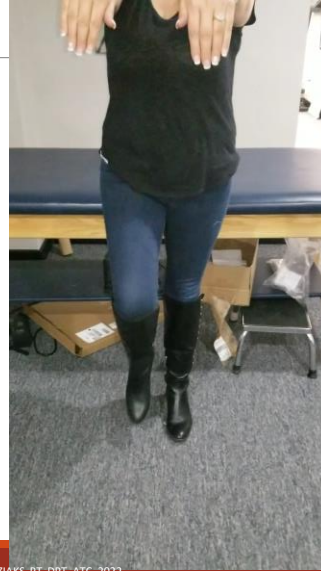


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# Level 1 – ATNR

Zombie



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## Visit 2

Typically progress bridge, zombie

Add duck, pigeon

Introduce slap tap, starfish

\*\*Do not progress any that are not at 2x10, symptom free, and perfect form\*\*

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# Duck

Toes out, walking heel to arch

- One foot right in front of the other

Smooth hips and steps – no hip hiking

Hands in fists touching – straight elbows

- You can modify amount of flex for shoulder pain if required

Don't arch your back

1x 20feet



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# Advanced Moro Exercises



## Duck on a bike



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# Pigeon

Toes in, walking toes to arch – one foot right in front of the other

- Some people will need to start feet only to understand the pattern

Palms up and flat – pinky edge touching

Straight elbows, shoulder height (except in case of pain)

Walking flat feet, flat hands

- They will want to walk on toes / lean forward or on outside of feet
- Hands will start to pronate

Smooth hips and steps, good postural control

Don't arch your back

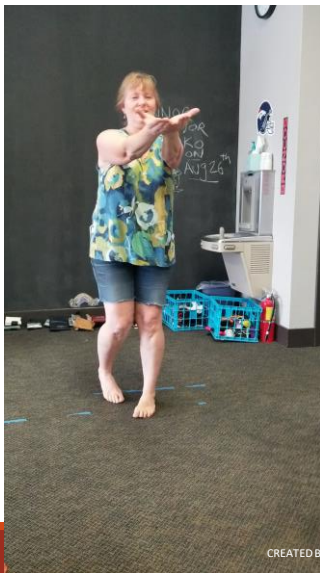
1x 20feet



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## Pigeon carrying a pizza – Generally Harder



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## Bridge – Level 2



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Once met all requirements for level 1 (or if 80-90% of the way there you can instruct for (I) progression at home)

Add pillow / towel between knees

- Will lead to increased sway

All prior requirements stay the same in position 2

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## Zombie – Level 2



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Once approx. 90% of the requirements – educate for Level 2 – or (I) progression over the course of the week

Progress to eyes closed – caution with balance

If high risk strategies present, use bilat tapping to resolve

If fearful of eyes closed – allow to interm open eyes initially

Turning and movement DOES not matter – postural control matters

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## Slap tap

Seated, hands on knees, feet on floor

Lifting opposite hand and toes – no movement in body, good posture

- First without callouts
- With hand callouts
- With feet callouts

Most patients will complete all 3 phases in the same week – if any are easy and no deficits, don't complete

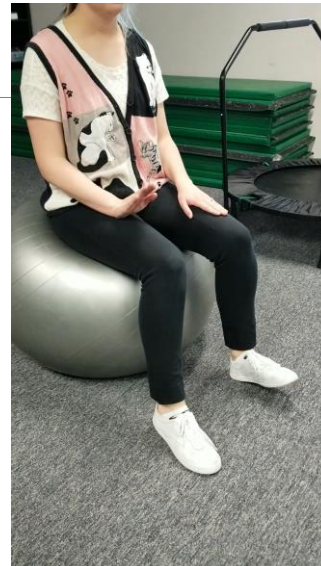
Either work on initiation or maintaining – whatever is harder



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## Complex Motor

Slap Tap



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# Starfish

Opposite arm and leg on top – fix it each time if incorrect

- Right arm on top, left leg on top

Move all 4 limbs

Slower and wider = harder

Work on maintaining or initiating

“Until it clicks” – this will cognitively feel difficult or provoke symptoms longer than it will appear they have deficits



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### Visit 3



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Typically d/c bridge, snow angel, bird dog, zombie, duck



Typically continue swimmer, level 2 superman, pigeon



Add slap tap, starfish



Potentially add in the following order: deadbug, robot, archer

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### Superman – Level 2



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Once Level 1 is at goals – progress  
HEAD DOWN, arms by sides  
Don't let the feet touch each other  
Elbows and knees straight  
Hold for 5 seconds  
No bounce or wiggle  
2x10

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Hooklying position, hands to the ceiling

Opposite arm and leg move AWAY from each other

Keep the still arm still

Work on maintaining or initiating

**Level 2: when appropriate**

Involves more core, may not always be applicable

Keep the still LIMBS still

## Deadbug



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## STNR – other

- Used as needed
  - Squat press
  - Lunge + Overhead Press
  - Deadbug



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Prone – start with arms by sides, head in the center  
 Bring the SAME arm and leg up while turning the head OPPOSITE  
 Move all limbs at the SAME time  
 Keep the still leg still – still leg with ABD or they will hold onto the table  
 It will be awkward but will get smooth and easy  
 Can be provocative of irritability  
 2x10 EACH side

## Robot – Level 1



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Often patients are at every other week by this visit – I will give both exercises and tell them to progress after at least 1 week AND at the goals

Prone – arms by sides, head in the center

All at the SAME time – move arm, leg, and head all in the SAME direction

This will be cognitively easier but harder to keep the still leg still

2x10 each side

## Robot – Level 2



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## Level 2 – ATNR, Robot – Level 1, 2



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## Archer

Front arm / leg straight, back arm / leg bent

Turn on the heels – you can take a step for balance

Both toes pointing forward (they forget the back foot)

Smooth and good control – hold 3 seconds per side

If mild impairment – add level 2 right away

Stare at the straight arm thumb as you rotate (initiate VOR ex)

- Balance will be impaired, coordination will decrease

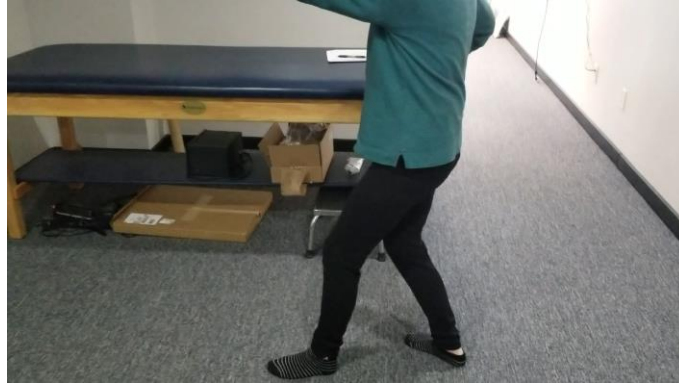
2x10 EACH side



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## Level 2 – ATNR, Archer



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## For Repeat Injuries or Youth

There are 3 additional exercises not used often that can be helpful for particularly populations.

“Slumber Party” – TLR – primarily for kids with retained reflexes, repeat injuries, severe injuries

“Palmar 1,2,3” – rarely used, for more severe injuries or patients with complaints regarding FMC

“Moro Hug” – calming, progression from starfish

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Prone on elbows – staring at the thumb the entire time

- Each movement takes 5 seconds

Rotate 45deg to the side with the elbow lifted

Push the elbow straight

Pull the elbow in

Turn back to center

Switch sides

3x each side

Typically takes 2-4 weeks to perfect

## “Slumber Party”



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## Palmar 1,2,3

Seated – looking for accuracy and control

Touch the thumb to the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, and then 3<sup>rd</sup>, 2<sup>nd</sup>, 1<sup>st</sup> digits in order. Say the number as you touch – 1, 2, 3, 4, 3, 2, 1 x 60sec

You are looking for a circle not a teardrop

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Seated – crossing SAME arm and leg on top  
Instead of crossing arms in front – you move into a hug motion  
Always make a X with the arms, hands to tops of shoulders  
Usually soothing – can keep as long as soothing  
Move slowly – breathe in as you expand for 3 seconds  
Breathe out as you cross opposites – 3 seconds

## Moro Hug



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Next: Overall  
Treatment  
Progression



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## Time for Exercises!

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## Combination – retention vs disinhibition?

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- **Level 3?**
- Play in postural reflex positions
  - Board games, blocks, coloring, reading
- Vision exercise in postural reflex positions
  - Scanning, figure ground, saccades, accommodation exercises
- Cognitive load
  - Add to balance, crawling, bear crawling, postural control exercises

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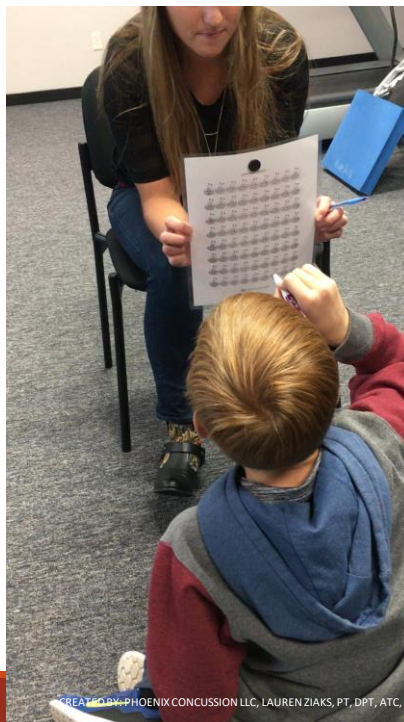


# Postural Changes The Effects



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## Prone on PB – extensor tone vs gravity



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## ½ kneeling for postural support



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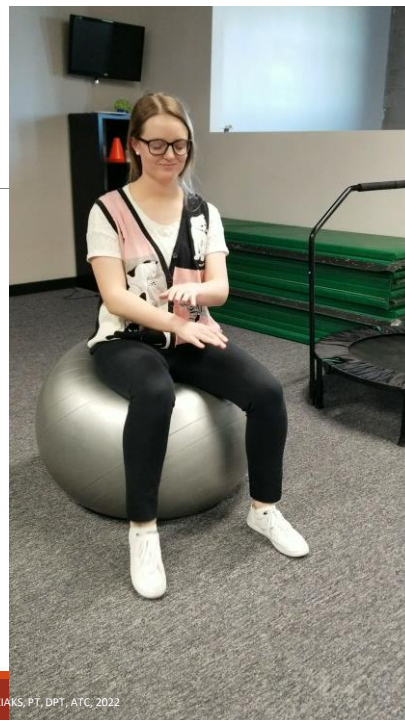
## Seated on PB for postural stability



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## Add Cognitive Load!



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# Exercise Protocol - Reminder

## LEVEL 1

- Bridge
- Superman, swimmer
- Cat/camel, Bird Dog
- Snow angel
- Marching Zombie

## LEVEL 2

- Pigeon, duck
- Deadbug
- Starfish
- Slap tap
- Archer
- Robot



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## Give it a try at home!

- Try any of these postural positions at home tonight!
  - Cook dinner in half kneeling or high kneeling
  - Do your paperwork side sitting
  - Sit on a physioball – it is good for you anyway!
  - Lay over a pillow, cushion, or physioball for extensors.
- If any of these are hard for you **WORK ON IT!**

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## Administration

- Documentation
  - + Reflex presentation
  - Integration date
  - Write areas of improvement needed as any other exercise – “pt continues to dem sig WS to R with bird dog” or “pt dem full integration of L1 PRI ex today.”
- Patient Education
  - Handout with overview of reflexes with their + reflexes indicated. All ther ex programs given with photos and written instructions to improve compliance

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## Billing

- Used as our ther ex portion of cspine visits or integrated during our normal vision and vestibular visits.
  - ICD-10 Codes
    - R29.2 Abnormal Reflex – never use as first code!
  - CPT Codes
    - 97110 – therapeutic exercise x 2
    - 97112 – neuro re-education
    - 97530 – therapeutic activities

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Questions?

Thank you!

Don't forget to complete all parts of this series to qualify for your CEUs!

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