
Balance and Eye Movement Challenges After Brain Injury or Surgery

Dr. Denise Gobert, PT, PhD, NCS
Professor, DPT Program
Texas State University



[Link to Lecture Handout](#)

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Why This Topic Matters

- Balance and vision work together
- Changes are common after surgery or injury
- Challenges often show up during daily activities



What We'll Talk About

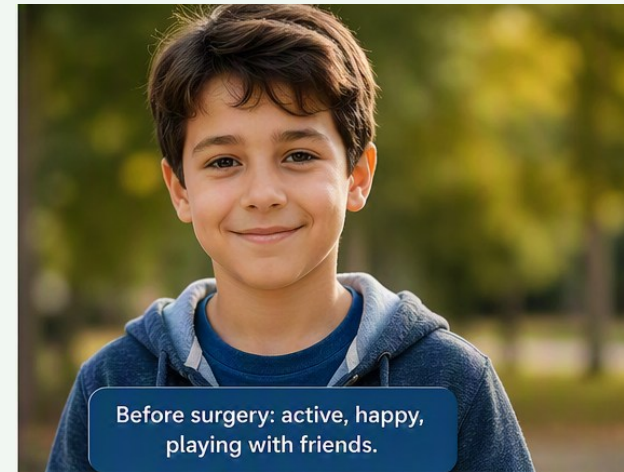


By the end of this presentation, attendees should be able to discuss:

- How balance and vision usually work together.
- What may change after surgery or injury.
- What families often notice at home or/at school
- Practical rehab ideas you can use right away
- When to ask for extra help.

Meet Liam

- Short case study:
- "Liam underwent epilepsy surgery at age 10. His **seizures improved**, but afterward he became dizzy when turning quickly, had trouble reading, and felt unsteady on playground equipment."
- Has anyone experienced something similar?



Dizziness with quick head turns



Trouble reading and eye fatigue



Feeling unsteady on playground equipment

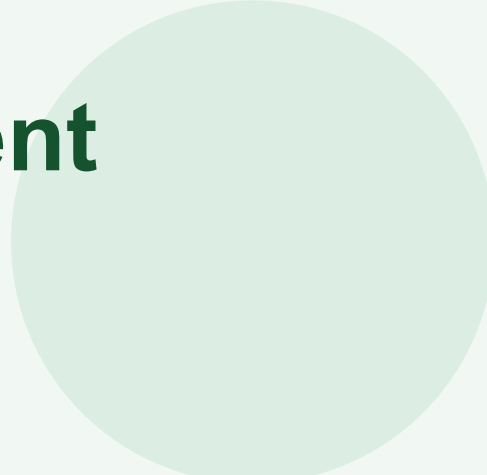


Less confidence in busy or noisy places



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Every Child's Recovery Journey Is Different



- Type of surgery or injury
- Age and development
- Skills before surgery
- Support and practice afterward

Children are still developing their balance, vision, and movement systems throughout childhood and adolescence.

What Can Change After Surgery or Injury

- Feeling unsteady
- Slower reactions
- Sensitive to movement or crowds
- Fatigue

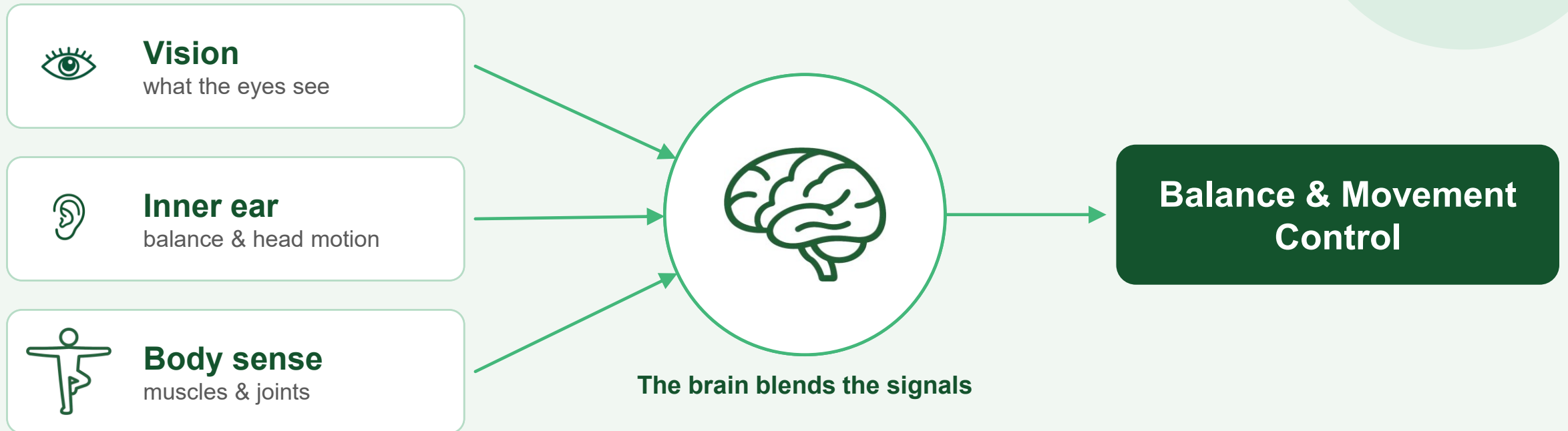


https://www.ncbi.nlm.nih.gov/core/lw/2.0/html/tileshop_pmc/tileshop_pmc_inline.html?title=Diplopia&p=BOOKS&id=441905_diplopia.jpg

Vision and confidence too: double vision, trouble tracking moving objects, reading fatigue, and a new fear of movement or crowds.

Why Does This Happen?

Balance depends on three senses working together — the brain blends their signals to keep the body steady.



When errors exist: after surgery or injury these signals can conflict, so the brain becomes overwhelmed — and balance and movement get harder. That is exactly what practice helps retrain.

Balance Is More Than “Not Falling”

- Eyes (vision)
- Inner ear (movement sense)
- Muscles and joints (body awareness)
- The brain coordinates these systems



Like a three-legged stool: if one leg is weak, staying balanced gets harder.

Vision Is More Than Seeing Clearly



- Read and track words
- Copy from the board
- Follow moving objects
- Stay steady while moving

Where it shows up every day: reading a book, copying the classroom board, sports, and video games.

How the Brain Connects Vision and Balance

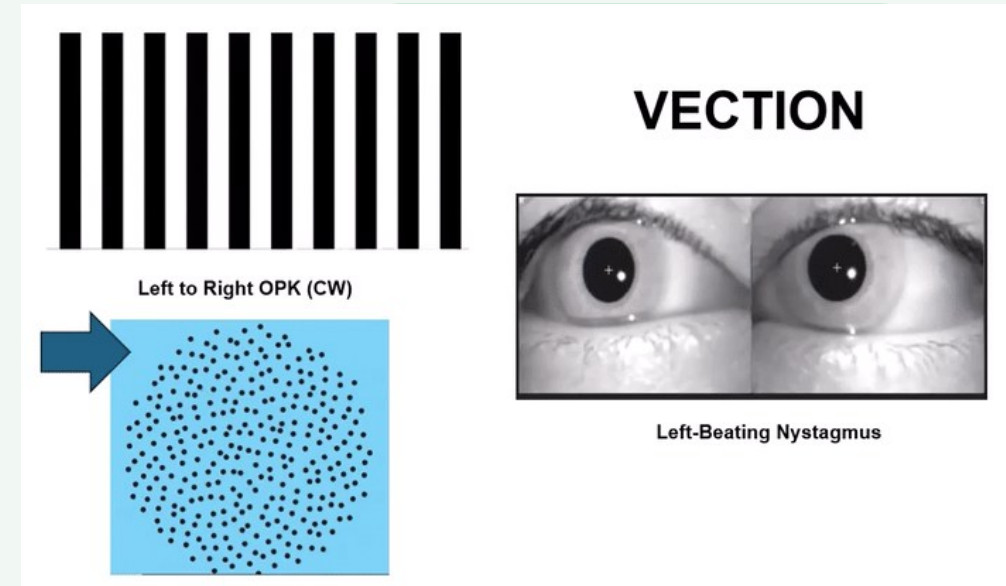


- The brain coordinates seeing and moving
- Surgery or injury can change coordination
- Practice helps the brain reorganize

Eye Movements That Help With Balance



- Three eye-movement skills that keep balance and vision steady:
- **Following a moving object** (*smooth pursuits*)
 - watching something move smoothly, like a ball rolling across the floor
- **Quickly shifting the eyes** (*saccades*)
 - jumping from spot to spot, like moving word to word when reading
- **Keeping vision clear while moving** (*vestibulo-ocular reflex, VOR*)
 - steady sight while walking or turning the head



What Families May Notice at Home



Needs to sit to get dressed



Uses walls or furniture for support



Avoids uneven surfaces



Tires quickly with standing tasks

What Families May Notice at School



Loses place while reading



Trouble copying from the board



Avoids PE or playground



More fatigue by afternoon

What Families May Notice During Play



**Hesitation on swings
or slides**



Avoids ball games



**Watches instead of
joining in**



**Frustration is
common**

Balance May Look Different Than Before



- Watches feet more
- Moves more carefully
- Avoids quick turns
- Often a smart safety strategy

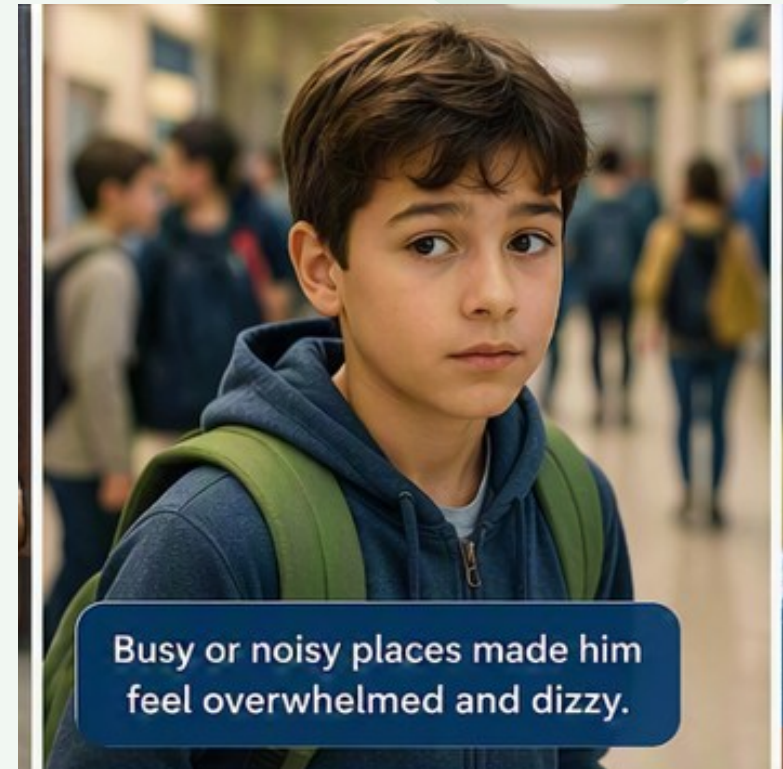


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Busy Visual Environments Can Be Hard



- Crowds and movement compete for attention
- Stores, playgrounds, loud classrooms
- Less busy spaces may feel easier



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When to Keep a Closer Eye on Changes



- Frequent falls
- New dizziness or headaches
- Losing skills that were coming back
- Reach out to your healthcare team

What Families Tell Us

- “We thought our child was being cautious.”
- “They were working harder to balance.”
- “We thought our child was avoiding reading.”
- “Their eyes were getting tired.”
- “We thought our child was losing confidence.”
- They needed more support.”

What You Can Practice

Simple exercises we recommend for the clinic
and at home

What Rehabilitation Focuses On

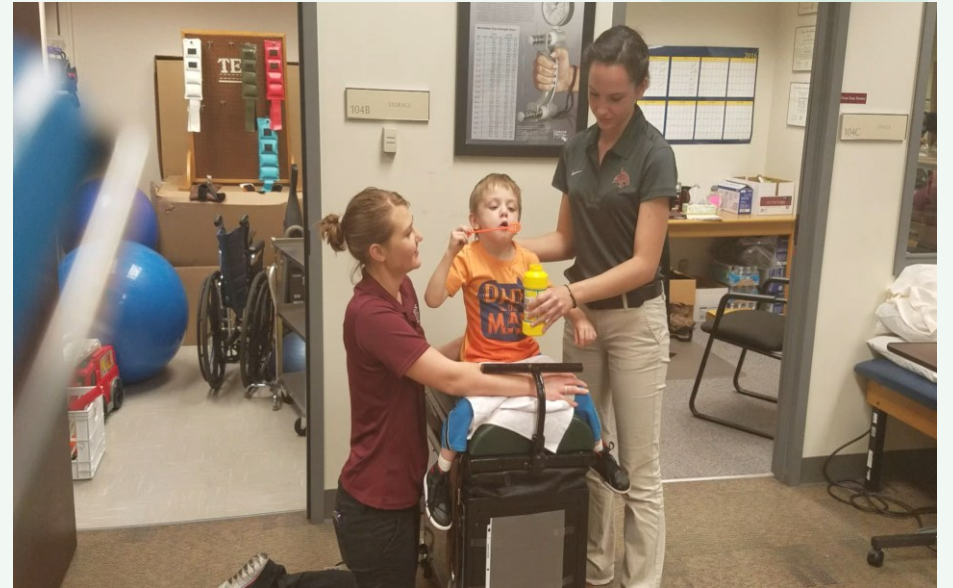
- Practice real-life activities
- Improve coordination over time
- Build confidence and independence



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Vision-Related Therapy Examples

- Eye tracking games
- Head and eye coordination
- Reading with gentle movement
- Matching vision with body movement



Learning to track, focus, and scan helps children return to reading, schoolwork, sports, & play.

Balance-Focused Therapy Examples

- Standing and reaching
- Walking and turning
- Different surfaces
- Games that challenge balance



Therapy Happens Beyond the Clinic

- Home routines count
- School supports matter
- Play is practice



Powerful opportunities for practice and growth.

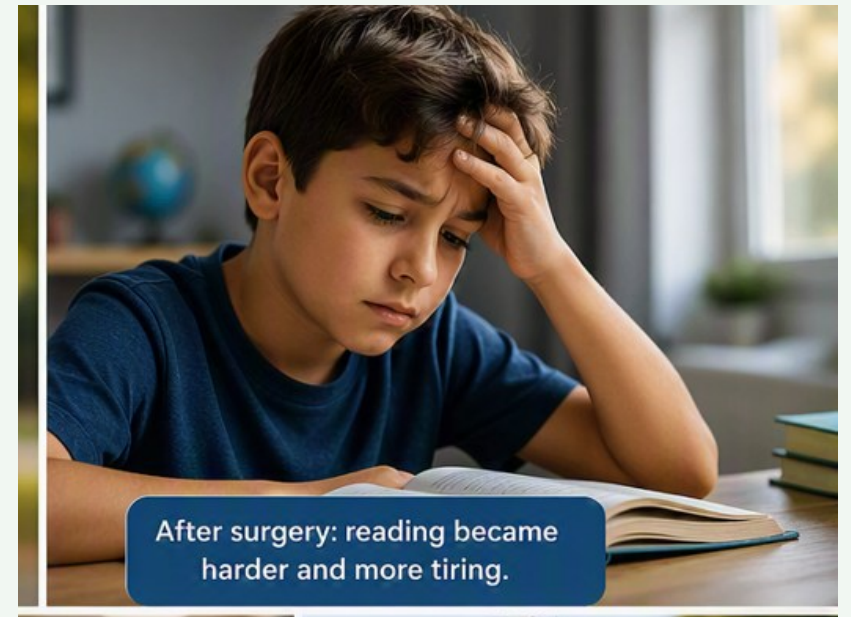
Simple Home Tips

- Good lighting
- Reduce clutter
- Sit when tired for visual tasks
- Break tasks into smaller steps



Supporting Success at School

- Preferential seating
- Extra time for visual work
- Movement breaks
- Communicate with teachers



After surgery: reading became harder and more tiring.

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Liam was an “A: student before having surgery; how might this make it extra hard for him to seek help?

6 – Home Program Exercises

Here are some basic common exercises you can try:

1. Pointer-In-Straw Exercise
2. Pencil Push-Ups Exercise
3. Brock String Exercise
4. Visual Tracking Exercise
5. Near-Far Shifting Exercise
6. Vestibular-Eye Exercise (VOR)

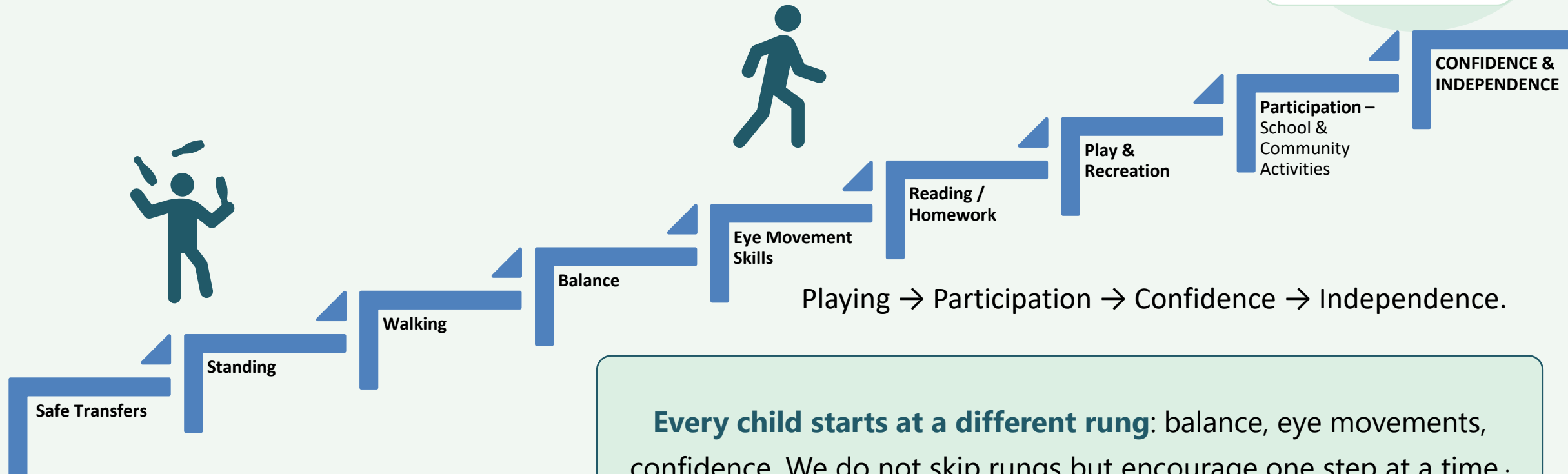


[Link to Handout](#)

These strategies are not just ideas—there is **growing research supporting** visual rehabilitation and recovery following brain injury (Chen 2025; Crampton 2022; Ghosh 2026)

What Does Recovery Look Like?

The ladder of progress



Progress Is Not Always Linear



- Good days and harder days are normal
- Small wins add up over time
- Support and patience matter

Progress is not a straight line.

Supporting Confidence

- Celebrate progress
- Let kids describe what feels hard
- Encourage safe exploration

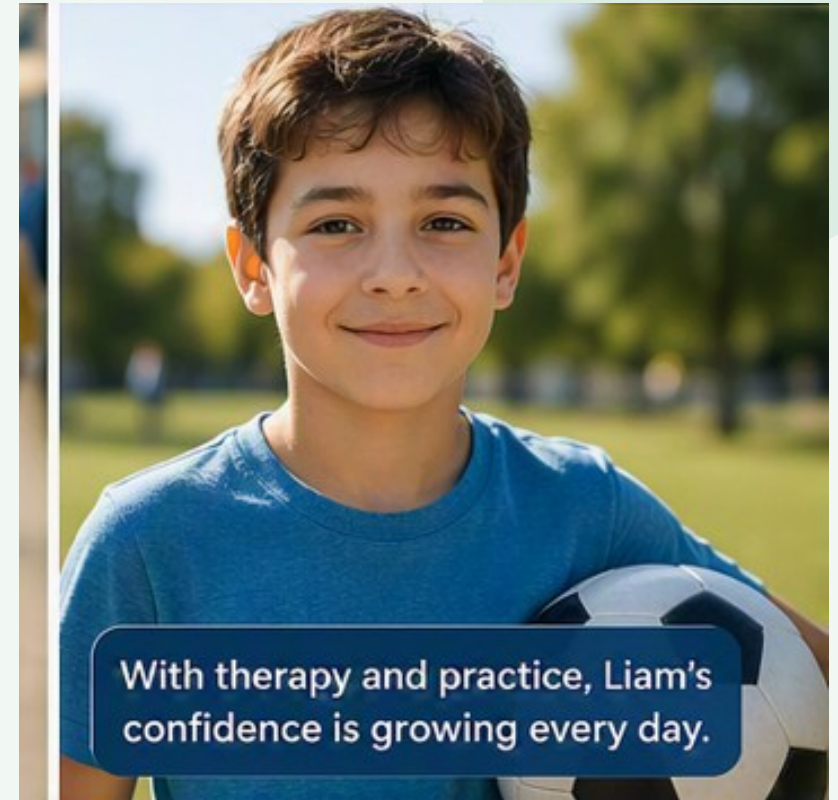
Confidence: Just as important as physical skills.



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Practice that Feels like Play = Participation

- Modify rules when needed
- Start with short play times
- Praise effort, not perfection



With therapy and practice, Liam's confidence is growing every day.

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Liam's story is one that many children experience.

The good news is that the brain can heal, adapt, and get stronger with the right support, practice, and time.

Who Can Help Your Child

Your Child's Recovery Team May Include:

 Neurologist / Neurosurgeon

 Physical Therapist

 Occupational Therapist

 Vision Specialist

 School Team

 Family & Caregivers



These disciplines frequently work together to address balance, coordination, dizziness, and visual challenges after neurological injury or surgery.

Helpful Questions Families Can Ask



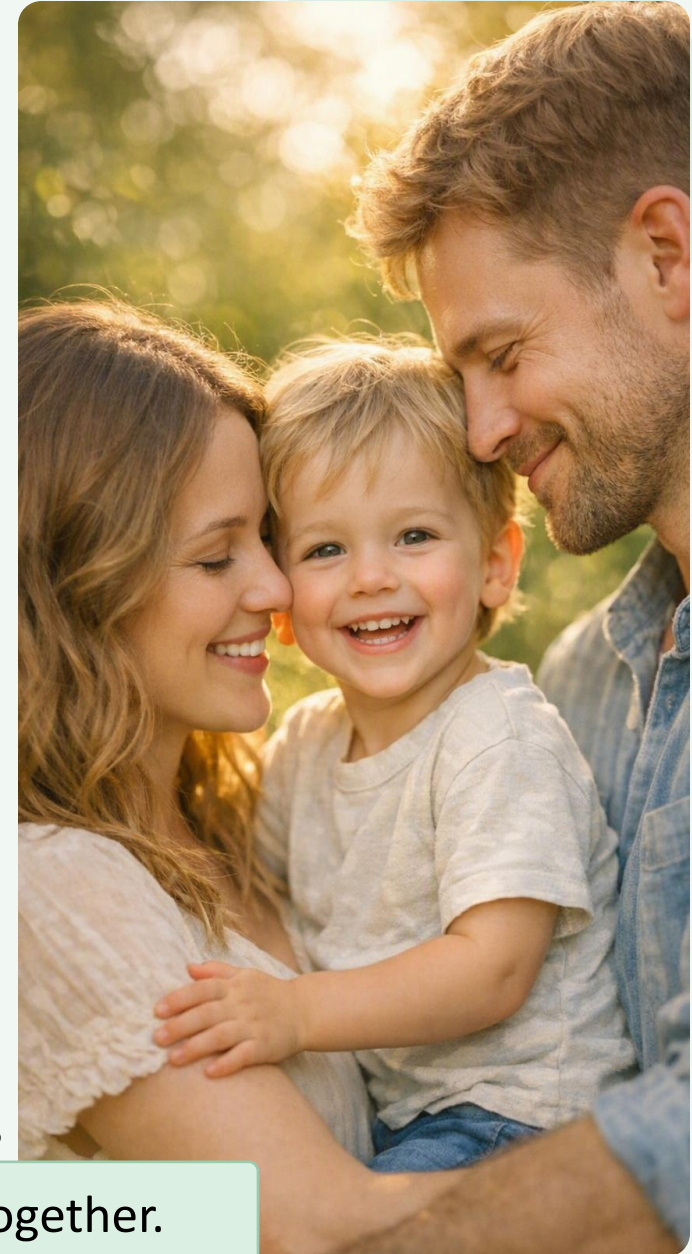
- How does vision affect balance for my child?
- What should we practice at home?
- What should the school know?

Families can ask great questions: How does vision affect balance, which activities to practice @ Home,& what specific support does their child need @ School

Key Take-Home Messages

- Vision and balance are **connected**
- Changes after surgery are **common**
- The brain **can adapt**
- Everyday activities are **powerful practice**
- Families are **critical partners**
- **Participation matters** more than perfection

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Recovery works best when families, healthcare providers, and schools work together.

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Questions & Discussion

Thank you for being here
Your questions are welcome

Dr. Denise Gobert
EM: dgobert@txstate.edu
Texas State University



With therapy and practice, Liam's confidence is growing every day.

The Current Research References

1. **Chen AM**, Salzano AD, Burgher AP, et al. Intervention for ocular motor disorders in children and adults with mild traumatic brain injury: a scoping review. *Optom Vis Sci*. **2025**;102(4):204-214. [\[pubmed.ncbi.nlm.nih.gov\]](https://pubmed.ncbi.nlm.nih.gov/)
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3. **Ghosh D**, Marusic S, Haensel JX, et al. Evaluating post-concussion symptom profiles using the convergence insufficiency symptom survey in a pediatric and adolescent cohort. *Front Neurosci*. **2026**;20:1799528. [\[frontiersin.org\]](https://frontiersin.org/), [\[frontiersin.org\]](https://frontiersin.org/)
4. **Alvarez TL**, Scheiman M, Hajebrahimi F, et al. CONCUSS randomized clinical trial of vergence/accommodative therapy for concussion-related symptomatic convergence insufficiency. *Br J Sports Med*. **2025**. [\[pmc.ncbi.nlm.nih.gov\]](https://pmc.ncbi.nlm.nih.gov/)
5. **Scheiman M**, Kulp MT, Cotter SA, et al. Interventions for convergence insufficiency: a network meta-analysis. *Cochrane Database Syst Rev*. **2020**;12:CD006768. [\[pubmed.ncbi.nlm.nih.gov\]](https://pubmed.ncbi.nlm.nih.gov/)

References

- 🧠 **Brain Injury Association of America (BIAA)**
 - Website: <https://biausa.org/>
- 🦶 **Vestibular Disorders Association (VeDA)**
 - Website: <https://vestibular.org/>
- 👁️ **Neuro-Optometric Rehabilitation Association (NORA)**
 - Website: <https://noravisionrehab.org/>
- ❤️ **Pediatric Epilepsy Surgery Alliance**
 - Website: <https://epilepsysurgeryalliance.org/>