

RUNNING CASE 2

1. What are your key findings from the running analysis and do they relate to this patient's symptoms and injury history?

Her symptoms are only running-related.

After 15–20 minutes of running → Unable to continue running, bilateral cramping in the anterolateral part of both legs.

Examination:

- Unable to reproduce symptoms during clinical examination.
- No tenderness on palpation of the leg muscles.

Possible biomechanical factors:

- **Low cadence:** Her running cadence is relatively low (154).
- **Excessive vertical oscillation:** The video shows a significant up-and-down displacement of the center of gravity (Vertical oscillation)
→ Possible cause: **Hip extension deficit** in the Toe-off phase.

Injury history:

- Medical diagnosis: **Chronic Exertional Compartment Syndrome**
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2. Is there a role for gait re-training for this patient, based on your findings? (Yes or No)

Yes, there is an abnormal movement pattern (low cadence, excessive vertical oscillation linked with hip extension deficit) possibly linked with tissue overload. The movement pattern can be improved. Her symptoms are only running-related. The rest of the time she is pain free.

She has the ability to run for 15–20 minutes pain-free → she wants to build volume.

We should therefore try to modify her running biomechanics to see if this improves her symptoms.

3. What are your goals for gait re-training to reduce their symptoms and injury risk?

- **Gradually increase cadence** (aiming eventually for 170 steps per minute)
- **Reduce vertical oscillation (bounce)**

- **Improve hip extension in the Toe-off phase (also check big toe extension)**
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4. How can you achieve this goal in this runner?

Internal Cues

To improve cadence:

- “Shorten the stride”
- “Take quick short steps”

To improve vertical oscillation:

- "Imagine that you're running with a ceiling which is 2 inches above your head and try not to hit the ceiling with your head."

To improve hip extension (better recruitment of the gluteal muscles):

- “Push treadmill back”

External Cues (Mirror, tape)?

To improve cadence:

- Use of a **metronome**
- **Smartwatch** with cadence feedback

To improve vertical oscillation:

- **Mirror training** (visual feedback)
 - **Encourage soft landing** (e.g., barefoot training)
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Mobility or Running Drills?

Running drills:

- **Plyometric drills** to improve lower limb stiffness (to limit vertical oscillation)
- If **extension in the Toe-off phase is limited**, suggest drills that engage the gluteal muscles to improve push-off:
 - Kick your heels back
 - Drive your knee forward
 - Push through the calf

- “Squash an orange under your hips”

Mobility drills:

- Suggest **hip extension mobility exercises** (e.g., self-mobilisation with elastic bands → Mulligan MWM)
- Also, check **big toe extension**. If it’s limited, perform **manual therapy**.
- **Strengthening program** for the posterior chain (hamstrings & calves)

Obviously, you shouldn’t try to correct everything in one session, or the patient may get confused.

Start by prioritising cadence increase, and only **secondarily address hip extension**.

5. What are the potential barriers?

Training-related factors:

- Gradually build cadence, **increase by 5–7.5%**
- **Adjust cadence based on symptoms**, otherwise there’s a risk of injury

Physical factors:

- If **hip extension** and **big toe extension** are limited, improvement may take several months.
→ **The patient may become discouraged**

Neuromuscular and technical factors:

- Difficulty integrating new cues: Some runners struggle to apply real-time corrections, whether internal or external.
→ **Keep it simple**. If one cue doesn’t work, try another.
- **Obviously, you shouldn’t try to correct everything in one session**, or the patient may get confused.
Start by prioritising cadence increase(1-2 sessions), and only **secondarily address hip extension**.

Psychological factors:

- Established habits: If she has been running this way for years, adapting to a new pattern will require cognitive effort.
→ Possible performance drop in the first 2–3 weeks.

