

Case Study of ACL RECONSTRUCTION with VITAL.PT









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INTRODUCTION:

The **Anterior Cruciate Ligament (ACL)** is a vital structure in the knee, responsible for preventing excessive forward movement of the tibia and controlling rotational forces. During activities like pivoting and kicking, it plays a key role in maintaining knee stability. Injuries to the ACL often result from sudden changes in direction, twisting motions, or awkward landings. Common symptoms include a "popping" sensation at the time of injury, sudden sharp knee pain, rapid swelling, "giving way" of the knee, and restricted mobility. In cases of complete ACL rupture accompanied by significant instability, surgical reconstruction is recommended. This involves replacing the torn ligament with a graft, usually taken from the hamstring or patellar tendon, or sometimes from a donor. Post-surgery rehabilitation is crucial, as it restores knee stability, and function, while also reducing the risk of re-injury and supporting long-term joint health.



SUMMARY:

A young adult underwent ACL rehabilitation. A thorough assessment, including **VITAL.PT** plantar pressure analysis, was conducted. Based on the findings, a personalized treatment plan was developed, emphasizing weight distribution, strength, and stability. Significant improvements in pain and knee function were observed, highlighting the effectiveness of technology-based rehabilitation.



HEALTH STATUS:

A 27-year-old male with a desk job presented with right knee pain following surgical intervention for ACL injury.

HISTORY OF PRESENT CONDITION:

- The patient reported twisting his right knee while jumping across a puddle on the road.
- This caused sharp pain in the knee, leading him to consult an orthopedic doctor who diagnosed a Grade 3 ACL tear with minor meniscus injury.
- 2 months later, he underwent surgical reconstruction and began physiotherapy
 1 week post-surgery.

[SESSION 1] SUBJECTIVE EXAMINATION:

• Pain in the anterior aspect of the right knee, rated 10/10 at worst. Aggravated with knee movement and weight bearing.

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OBJECTIVE EXAMINATION:

- **Observation:** Mild swelling over right knee.
- Palpation: Grade 1 tenderness around sutures.
- Active ROM: Hips full, knee flexion limited and painful
- Special Test: Ligament and meniscus tests negative
- Lower Limb Strength: Poor on affected side, good on normal side
- Gait: Antalgic pattern, used a walker for assistance (for 2 months)



VITAL.PT PLANTAR PRESSURE ANALYSIS FINDINGS:

1. STANCE TEST:

• Reduced weight bearing on affected side with altered forefoot and hindfoot loading as a result of pain and subsequent compensation.



2. ARCH TYPE TEST:

• Indicative of normal arch on both sides.



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3. BALANCE TEST:

• Centre of Pressure (COP) shifted towards left foot due to uneven weight distribution along with greater increase in eyes closed condition suggestive of proprioceptive deficits.

Balance Assessment Report	
Eyes Open	Eyes Closed
Sway Distance:248.78 mm	Sway Distance:659.34 mm
Normal	Poor Balance 2.5

GOALS AND INTERVENTIONS:

1. Patient Education:

• Explained about protecting the surgical site (avoiding high-impact activities, placing a pillow under the knee while resting), strategies for pain management, safe mobility with a walker and gradual progression of weight-bearing, as well as self-care techniques and lifestyle modifications.

2. Restore Mobility:

• Initiated with passive movements progressing to gentle muscle activation exercises such as static quads, hams and glutes. (3 sets of 10 reps)

• Active ROM for hips with exercises like SLR in supine and side lying along with pelvic bridges. (2 sets of 15 reps)

3. Regain Muscle Strength:

 Initiated low intensity strengthening exercises for knees and hip such as abductor press with pilates ring, dynamic quads, quad press in standing with soft ball support, calf raises. (2-3 sets of 10-15 reps)

• **ReGo:** Employed Shaolin game to progress to single leg standing with ankle weights to strengthen hip abductors.



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4. Enhance Balance and Proprioception:

- Progressed to hip abduction and extension in standing (2 sets of 15 reps) as well as mini wall squats to unsupported squats. (1 set of 15 reps)
- **ReGo:** Utilized Shaolin game for double leg stance and Shrinking Island game for lunges using a balance disc to improve stability.

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5. Optimize Gait:

• Performed Obstacle training and Side walking with theraloop (5 rounds) to engage stabilizing muscles and enhance lower body strength.

[SESSION 14]: OUTCOME

- Reduced Pain: 2/10 during activity
- **Improved Foot Pressures:** Equal bilateral weight distribution with near normal forefoot and hindfoot loading.
- **Increased Mobility and Strength:** Greater knee range of motion and muscle strength, enabling better performance during daily activities and at work activities.
- **Normal Gait:** Achieved a symmetric gait pattern with less discomfort and better control.





CONCLUSION:

In conclusion, the use of **VITAL. PT** and **REGO Technologies** in ACL rehabilitation proved highly effective in enhancing recovery. VITAL. PT's plantar pressure analysis allowed for a personalized treatment plan, addressing weight distribution, balance, and proprioception. REGO's gamified exercises further improved muscle strength, balance, and stability, increasing patient engagement. The patient showed significant improvements in pain reduction, knee function, and gait symmetry, highlighting the value of integrating these technologies into post-operative rehabilitation. This approach not only accelerates recovery but also reduces the risk of re-injury, offering a comprehensive strategy for long-term joint health.