**Original Research Abstract Example:**

**The Effects of a Four Week Home Exercise Plan using Low Load Plyometric**

**Exercise After ACL Reconstruction**

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**Context**: Home-based rehabilitation, including plyometric exercise, has been recommended as an effective adjunct to traditional care for individuals with ACL reconstruction (ACLR) with persistent quadriceps strength asymmetry. However, it is challenging to monitor patient compliance with home exercise programs (HEP) and the intensity with which a patient completes the recommended exercises. Compliance and performance monitoring using wearable technology may promote enhanced patient

engagement in a cost-effective manner. The purpose of this study was to assess the efficacy of an objectively monitored four-week home-based plyometric exercise program on quadriceps strength and single leg hop performance among individuals with persistent quadriceps strength asymmetry following ACLR. **Methods:** Fifteen individuals (11 women/4 men) enrolled in this pilot efficacy study. Four individuals withdrew due to schedule constraints, and one individual withdrew due to knee pain. Assessments were completed pre- and post- the 4 -week HEP (5.0±0.6 weeks). At both study visits, self-reported knee function was evaluated using the International Knee Documentation Committee Subjective Knee Evaluation Form (IKDC). Quadriceps peak torque (PT) was assessed via isokinetic dynamometer (60°/s). Strength data were normalized to body weight (Nm/kg). Single (SH) and triple hop (TH) were assessed bilaterally and normalized to leg length. The six-meter timed hop (6m) was assessed using infrared timing gates (s). For all hopping tasks, an average distance or time of three successful trials were recorded for each leg. Limb symmetry indices (LSI) were calculated by dividing the ACLR limb values by the contralateral limb values and multiplying by 100. Following the pre-intervention assessment, participants were familiarized with the HEP (Figure 1) and, the Vert monitor and mobile application to ensure the patient’s ability to complete all study activities in the home environment. Compliance was monitored using the Vert jump count and jump height data stored in a cloud-based storage system. Separate repeated measures ANOVAs were used to assess change in IKDC and LSI between time points. Eta squared effect sizes were calculated to quantify magnitude of change post-intervention. **Results**: Four individuals withdrew due to schedule constraints, and one individual withdrew due to knee pain which resulted in 10 individuals (9 women/1 man; height=168.5±8.9 cm; weight=71.3±15.9 kg; age=18.0±2.3 years; months since surgery=27.1±20.8) completing the intervention. IKDC score and

quadriceps PT LSI (*p*=0.55, η=0.04) did not significantly improve post-intervention. The 6m-LSI (*p*=0.02, η=0.49) improved post-intervention, but SH (*p*=0.47, η=0.06) and TH (*p*=0.72, η=0.02) did not. **Conclusions**: Four weeks of low-load plyometric exercise improved 6m-LSI in individuals with ACLR but was insufficient training volume to improve quadriceps PT-LSI. Improved speed during the 6m may indicate improved quadriceps rate of torque development, that may stabilize the knee and reduce the risk

of injury. Future research should examine the effects of higher training volume using low-load plyometric exercise. **Word Count:** 449

**Level 4 Clinical CASE Study Abstract Example:**

**Labral Injury or Reproductive Complication? Hip Pain in an Adolescent Female Athlete**

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**Background**:  18-year-old female high school multi-sport athlete complaining of right hip pain for the past 8 months. She first noticed pain while kicking a soccer ball but denies inciting injury. The patient stated that 2 months ago she dove during volleyball and experienced pain throughout the season with similar activities. Pain is located at the right anterior hip and groin. The patient describes pain as a “C-shape pain in the front of my hip and the pain is deep”. The patient reports pain with prolonged standing, going up and down stairs, pain upon waking in the morning, transitioning from sitting to standing and ambulating throughout the school day. She denies numbness or tingling down the leg, locking or catching, instability, previous injuries or surgeries. Pain is rated as 6/10 on Numerical Pain Rating Scale. Manual muscle testing reproduced pain in right anterior hip. Hip scour and hip flexed to 90 degrees with posterior shear causes pain. Fulcrum test, hop test and heel strike were positive. Ober’s test positive. She was referred from the Athletic Training Facility to the team physician. **Differential Diagnosis**: Femoral acetabular impingement, Labral hip tear, Femoral neck stress fracture, Relative Energy Deficiency Syndrome, Right inguinal herrnia. **Treatment**:  During physician encounter, the mother was concerned of the child’s nutrition and caloric intake given how active she is in sports. The patient states she skips breakfast and sometimes lunch but does eat a large dinner. She endorses intermittent menstrual irregularities over the past year, getting multiple periods in any given month and periods can sometimes be prolonged more than 7 days. She endorses difficult to control acne. She has had hair loss in the past but denies facial hair growth. She denies sexual activity. The hip exam by the team physician was consistent with the AT exam. A MRI of the right hip was obtained and was negative for hip pathology or inguinal hernia but revealed numerous ovarian cysts of varying size on the left and right ovaries, measuring up to 3.3cm. MRI results raise concern for Polycystic Ovarian Syndrome (PCOS), therefore, laboratory studies were obtained including Complete Blood Count, Comprehensive Metabolic Profile, Hemoglobin A1c, Thyroid Screen, Follicle Stimulating Hormone, Luteinizing Hormone, Prolactin, Estradiol and Lipid Profile; all of which were unremarkable. The patient was given a prescription for Naproxen and was referred to OB/GYN for PCOS.  The patient was treated medically by placing her on an oral contraceptive pill. Ultrasound performed 3 months after treatment indicates that the cysts had resolved, along with her hip pain. **Uniqueness:**  Ovarian cysts are fluid-filled sacs that grow on the ovaries. They usually have no symptoms, although when they do manifest symptoms, it is often described as pain that radiates to the hip and groin. PCOS is a complex condition that affects approximately 7% of reproductive-aged women in the United States. Work-up for PCOS is sometimes prompted by incidental findings of multiple ovarian cysts after imaging modalities such as ultrasonography, MRI or CT scans (Williams, Mortada, & Porter, 2016). **Conclusions:**  The location of hip pain is sometimes difficult to isolate as pain is often referred to the groin, thigh, and buttock, in accordance with the innervations of the hip joint from the obturator, femoral and sciatic nerves (Taunton, 2007). Special considerations should be made with each individual patient’s unique history, as the female athlete presented in this case had no clear mechanism of injury, concomitant pelvic sources of pain must be considered. **Word Count:** 570