

BEYOND THE GROWTH PLATE: THE FUNCTIONAL AND EMOTIONAL RECOVERY OF A YOUNG ATHLETE AFTER A SALTER–HARRIS TYPE II FRACTURE



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Introduction

Growth plate injury is a debilitating condition for children. Salter–Harris type II fractures are the most common physal injuries in the pediatric population, accounting for approximately 70–75% of all growth-plate fractures [1]. The distal femur is significantly less common yet clinically important than other districts, as this physis contributes substantially to longitudinal lower-limb growth and is particularly vulnerable to growth disturbances. Surgical fixation may be required in unstable injuries or when displacement is considerable. Distal femoral physal injuries carry a higher risk than other locations of premature physal closure, angular deformities, and the need for corrective procedures [2].

Clinical Case

Few days before Christmas, LM, a promising sixteen-year-old American Football player with the dream of one day representing the Italian national team and earning a college scholarship in the United States, saw his path collapse in an instant. During a training session, a violent tackle resulted in acute pain and immediate swelling of the lateral compartment of his knee.

Clinical examination revealed significant edema, warmth, and tenderness over the lateral femoral condyle, with limited flexion and a defensive response to stability tests. After the Magnetic Resonance, the diagnosis became unmistakable: a Salter–Harris type II fracture of the distal femur. For LM, that moment was not only about physical pain. It was the sudden confrontation with fragility, the realization that everything he had built, the long hours of training, the sacrifices, the dream of his future sports career, could suddenly vanish. Once the diagnosis was confirmed, after an additional Computed Tomography scan, LM underwent urgent surgical stabilisation at the Rizzoli Orthopaedic Institute (Bologna, IT), under the care of Professor Stefano Zaffagnini. The procedure was successful, but what lay ahead was a long, uncertain road, a journey that would test both body and mind.

The rehabilitation program was divided into 6 hydrotherapy sessions to gently restore joint mobility and reduce post-operative stiffness, combined with 25 physiotherapy sessions in the rehab gym to regain muscle strength; 10 neuromuscular training sessions to restore proprioception and balance, with gradual close kinetic chain exercises to rebuild motor control of the entire lower limb; 2 on-field rehabilitation sessions to test sport-specific movements. The on-field rehabilitation was then entrusted to the team's athletic trainers, under close medical supervision, until the return to contact training. Every progression in the rehabilitation program was determined after careful clinical evaluation through follow-up medical examinations (5 over the 20-week treatment period), radiographic follow-ups and functional assessment tests to evaluate lower-limb strength recovery and symmetry, movement quality, and the recovery of aerobic and anaerobic capacity (see Table 1 and Figure 1 for further details).

LM faced all the rehabilitation phases with the same passion he once brought to the football field, quickly becoming an inspiration for other patients in the clinic. He transformed every setback into progress, and celebrating every successful test, every step closer to the ending phase. By June, under strict medical supervision, LM was ready to return to sport-specific drills. He gradually reclaimed the rhythm of running, the precision of cutting, and the joy of movement that defines his game. That summer, he achieved one of his first dreams: participating in an American Football training camp in Florida (USA), a desire he shared with the medical team during our very first consultation. By the start of the 2025/26 season, LM had been appointed captain of the Bologna Warriors U18 team. In his last official match, he led his teammates to victory scoring two touchdowns, a symbolic closure to a journey that had begun in fear and uncertainty. It was the living proof of a promise made to each other at the start of the rehabilitation journey: "we will do whatever it takes to bring you back, stronger than ever".

Conclusion

LM journey reminds us that healing is not merely the restoration of anatomy, but the reconstruction of identity, purpose, and belief in the future. His story stands as a testament to what can be achieved when evidence-based medicine meets empathy, and when a young patient's courage and determination turn recovery into rebirth.

TESTS	Results
Isokinetic (03/04/25)	13% deficit quad max strength, 12 % resistance, no deficit hamstrings
Isokinetic (24/06/25)	7% deficit quad max strength, no deficit resistance and hamstrings
MAT test (09/05/25)	80/100 sub-optimal, 20 weight shifts toward uninjured side
Mat test (24/06/25)	82/100 sub-optimal, 11% weight shifts toward uninjured side
Threshold test (14/05/25)	Aerobic threshold: 13 km/h, 157 bpm; anaerobic threshold: 16 km/h, 174 bpm

Table 1. Overview of the functional tests performed by the patient during the mid and late stages of the rehabilitation.



ANALISI DEL WEIGHT SHIFT

Analisi della distribuzione dei carichi al Drop Vertical Jump:

All'analisi della distribuzione dei carichi si è apprezzata una differenza pari al 20% del vGFR calcolato, con uno spostamento del carico verso l'arto destro (sano) come evidenziato nelle immagini allegate.

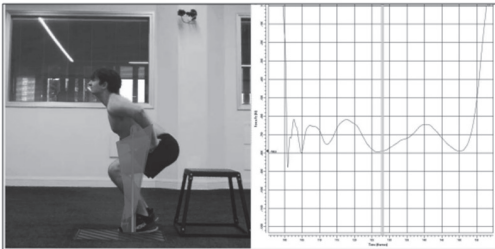


Figura 1. Picco medio iniziale di vGFR (vertical Ground Force Reactions) lato destro (arto infortunato): 904 N.



ANALISI DEL WEIGHT SHIFT

Analisi della distribuzione dei carichi al Drop Vertical Jump:

All'analisi della distribuzione dei carichi si è apprezzata una differenza pari al 11% del vGFR calcolato, con uno spostamento del carico verso l'arto destro (sano) come evidenziato nelle immagini allegate.

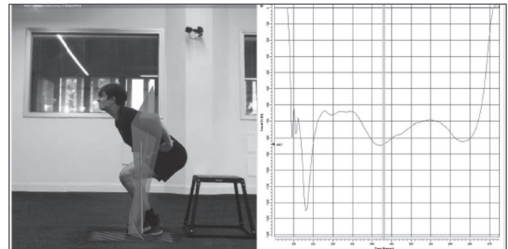


Figura 1. Picco medio iniziale di vGFR (vertical Ground Force Reactions) lato sinistro (arto infortunato): 1255 N.

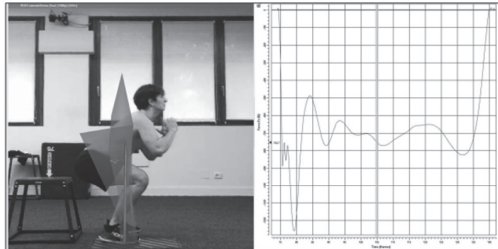


Figura 2. Picco medio iniziale di vGFR (vertical Ground Force Reactions) lato sinistro (arto sano): 1135 N.

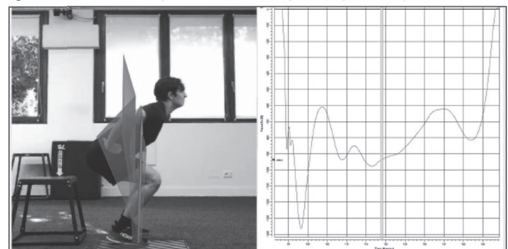


Figura 2. Picco medio iniziale di vGFR (vertical Ground Force Reactions) lato destro (arto sano): 1409 N.

Figure 1: Weight shift analysis from the first test (20% toward uninjured side) to the second test (11% towards uninjured side) during the vertical drop jump.

References

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- Arkader A, Warner WC Jr., Horn BD, et al. Predicting the outcome of physeal fractures of the distal femur. J Pediatr Orthop 2007; 27: 703–708