ADD CURE PHYSIOTHERAPY | OHM | KAN INNOVATIONS

RECOVERY

of POST-OP TALAR FRACTURE PATIENT with OHM SERIES

DR. ANSUMAN DAS

Physiotherapist and Sports Nutritionist
(MPT, BPT, CACT, CDNT, CKTP)

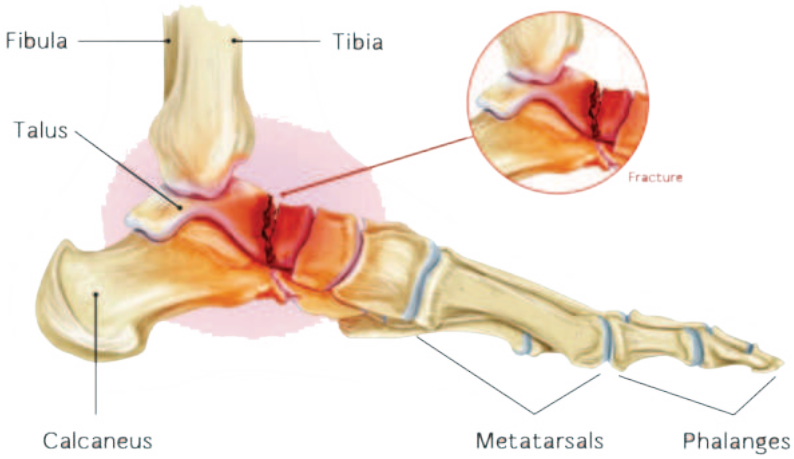
Unable to Walk

Walking Independently

KAN INNOVATIONS

RECOVERY OF POST-OP TALAR FRACTURE PATIENT

Using OHM Plantar Pressure System and Gaming Rehab Module



TALUS FRACTURE

Talar fractures, often from high-force trauma like accidents or falls, can lead to complications such as avascular necrosis and arthritis. Effective rehabilitation is crucial for restoring ankle function and preventing disability. The Plantar Pressure System gives detailed insights about weight distribution and gait pattern while the Gaming Rehabilitation allows for dynamic interaction and real-time feedback during therapy.

SUMMARY

- **Patient Profile:** 50-year-old male with a comminuted Right talus fracture.
- **Assessment Tool:** For advanced assessment, the OHM Plantar Pressure System was utilized.
- **Treatment Approach:** Conventional physiotherapy with Rego gaming rehabilitation.
- **Progression:** Transitioned from being Unable to Walk to Walking Independently.
- **First Visit:** Arrived at ADD Cure Physiotherapy clinic four months post-surgery, ambulating with a walker and partial weight-bearing on the affected side.

[To see the video click on the link:
https://drive.google.com/file/d/1fwcsq8Vb15G59csn-RLjTxM3fq5zYAd11/view?usp=sharing

KAN INNOVATIONS

HEALTH STATUS

A 50-year-old male presents with excruciating pain, discomfort and swelling in the right ankle, experiencing difficulty with movement and walking.

HISTORY OF PRESENT CONDITION

- Four months prior, the patient had been in a road traffic accident, causing comminuted fracture of his right talus.
- The severity of the injury necessitated surgical intervention, involving open reduction and internal fixation.
- After the operation, he was adviced 3 months of bed rest, followed by a month of home-based physiotherapy.
- After 4 months the patient reported to the ADD Cure Physiotherapy clinic with walking difficulty.

Week 1

SUBJECTIVE ASSESSMENT

- The patient reported significant dull aching pain around his right ankle joint, rating it as 5/10 at rest and 8/10 during activity on the NPRS (Numeric Pain Rating Scale).
- The pain worsened with ankle movement, standing, and walking, but eased with rest and the use of NSAIDs.

OBJECTIVE ASSESSMENT

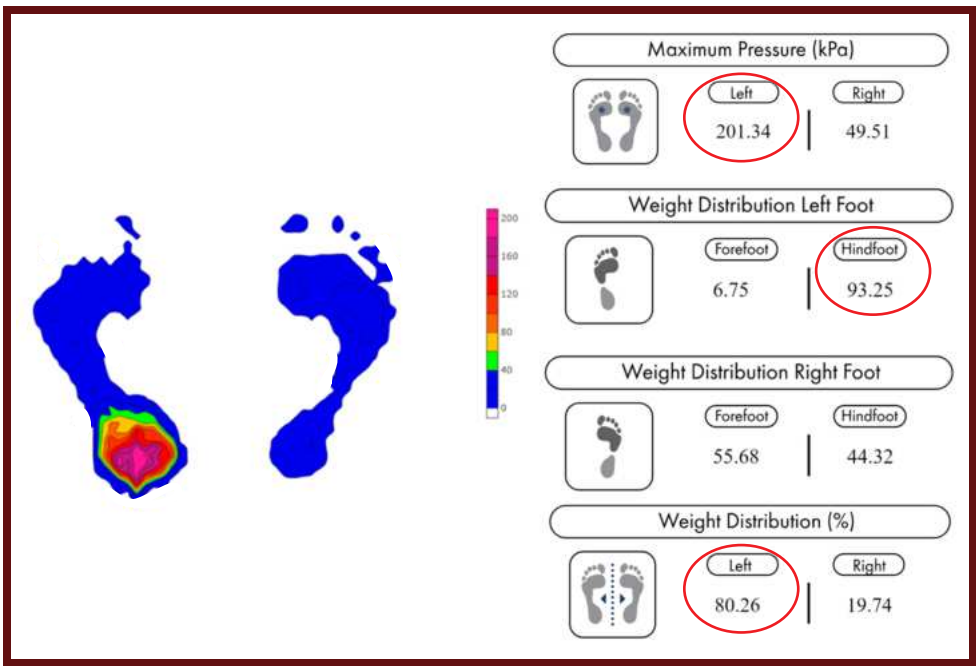
- **Swelling:** Noted around the ankle, with an ankle girth of 25 cm.
- **Tenderness:** Grade 2 tenderness observed over the talar head.
- **Range of Motion (ROM):**
  Dorsiflexion (DF): 0°-5°
  Plantarflexion (PF): 0°-15°
  Inversion (I): 0°-8°
  Eversion (E): 0°-5°
- **Strength Testing:** Hip abductors, extensors, and knee extensors on the right side scored 3+/5.
- **Ambulation:** The patient used a walker and exhibited an antalgic gait, with reduced weight-bearing on the right lower limb.
- **FADI Score (Foot and Ankle Disability Index): 41%**

KAN INNOVATIONS

PLANTAR PRESSURE ANALYSIS:

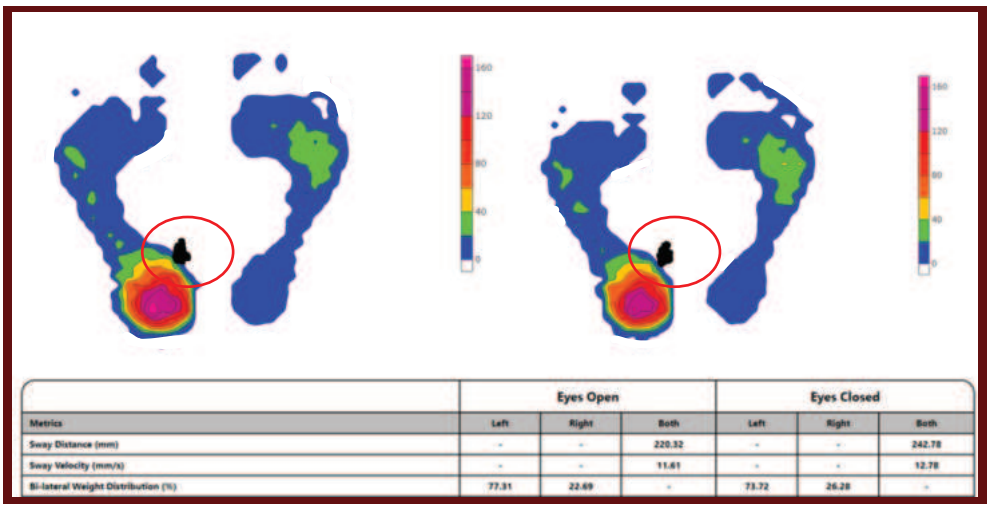
A. Bipedal Stance Test

- Higher Bilateral Weight Bearing on the left foot especially on the left hind foot marked by increased maximum pressure.
- Altered weight distribution between forefoot and hindfoot on the right side.
- High maximum pressure on the left hindfoot, attributed to compensatory mechanisms for pain.



B. Stabilometry Test

- Altered center of pressure (COP) position, shifted to the left due to pain and compensatory postural adjustment as you can see on the bilateral weight distribution metrics.



	Eyes Open			Eyes Closed		
Metrics	Left	Right	Both	Left	Right	Both
Sway Distance (mm)	-	-	220.32	-	-	242.78
Sway Velocity (mm/s)	-	-	11.61	-	-	12.78
Bi-lateral Weight Distribution (%)	77.31	22.69	-	73.72	26.28	-

C. Dynamic Test

Was not able to perform due to pain in the affected foot.

GOALS & INTERVENTIONS

Pain Relief:

1. **Grade 1 Joint Mobilization:** For ankle and subtalar joints, ensuring to avoid over-pressure at the fracture site and hardware.
2. **Contrast Bath:** Alternating cold and hot baths for 2 minutes each, totaling 10-15 minutes.

Swelling Reduction:

1. **Elevated Limb Positioning:** During non-activity periods.
2. **Compression Bandaging:** To manage swelling.
3. **Frequent Ankle Pumps:** 15-25 repetitions.

Increase Mobility:

1. **ROM Exercises:** For ankle and subtalar joints (2-3 sets, 10 reps).
2. **Stretching Exercises:** For hip flexors, quadriceps, piriformis, and gastrosoleus within pain tolerance (3-5 reps for 30 seconds).

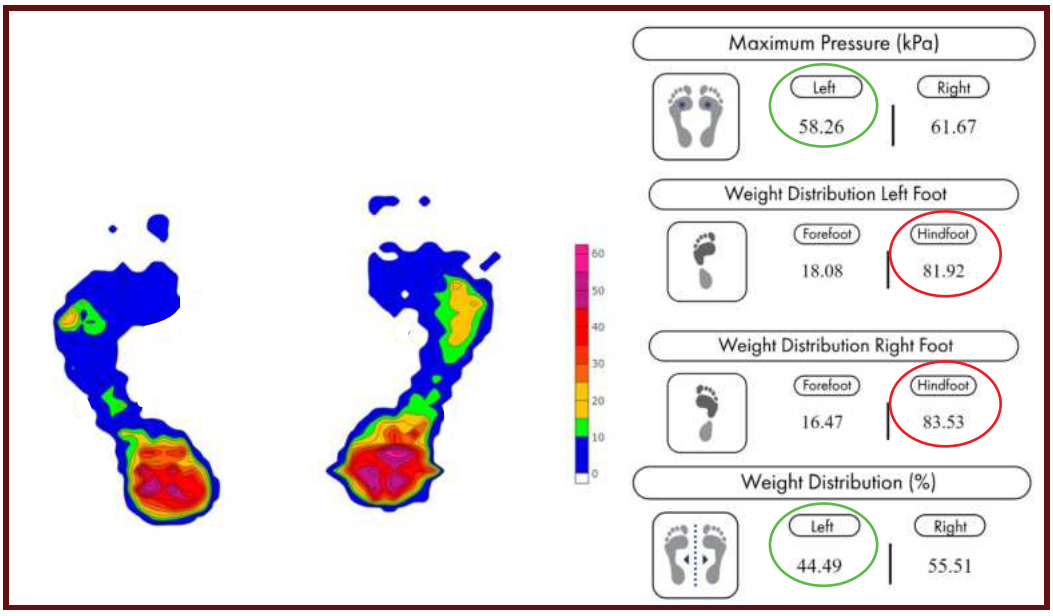
KAN INNOVATIONS

Week 7

PLANTAR PRESSURE ANALYSIS:

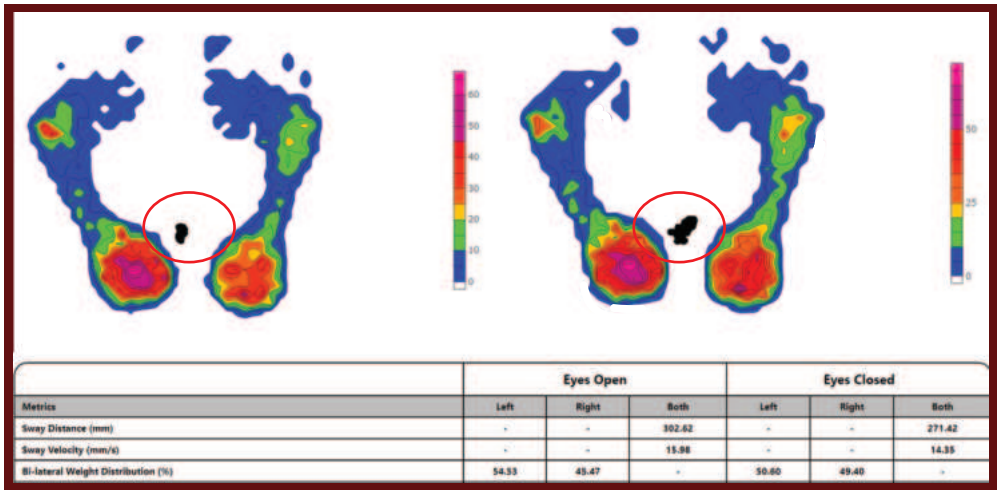
A. Bipedal Stance Test

- Improvement of left foot weight bearing thus normalizing bilateral weight distribution.
- Significant reduction in maximum pressure on the left hindfoot, now at 58.26 kPa.



B. Stabilometry Test

- After rehabilitation, the Center of Pressure (COP) position shifted to the center, indicating bilateral weight distribution, as shown in the report below.



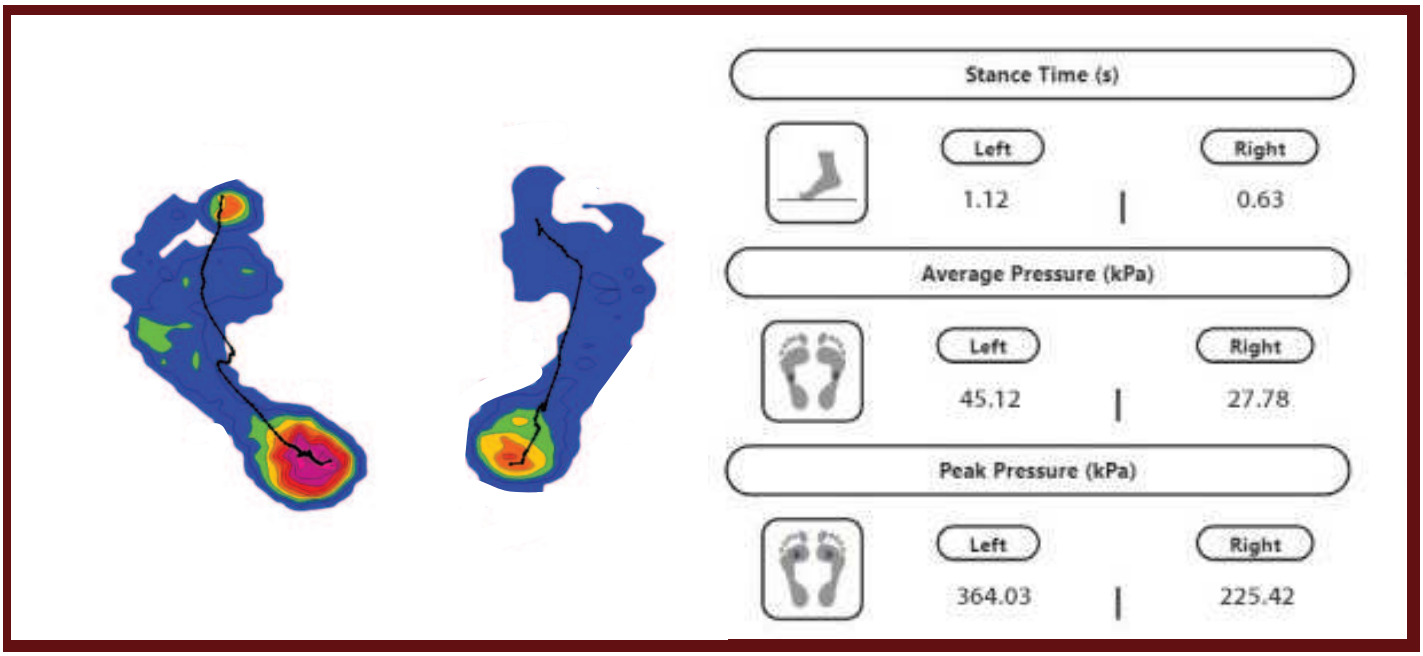
	Eyes Open			Eyes Closed		
Metrics	Left	Right	Both	Left	Right	Both
Sway Distance (mm)	-	-	302.62	-	-	271.42
Sway Velocity (mm/s)	-	-	15.98	-	-	14.35
Bi-lateral Weight Distribution (%)	54.53	45.47	-	50.60	49.40	-

KAN INNOVATIONS

C. Dynamic Test

[Was able to perform Dynamic Test with the support]

1. Increased stance time on the unaffected (left) limb.
2. Slightly elevated average and peak pressure on the left side.

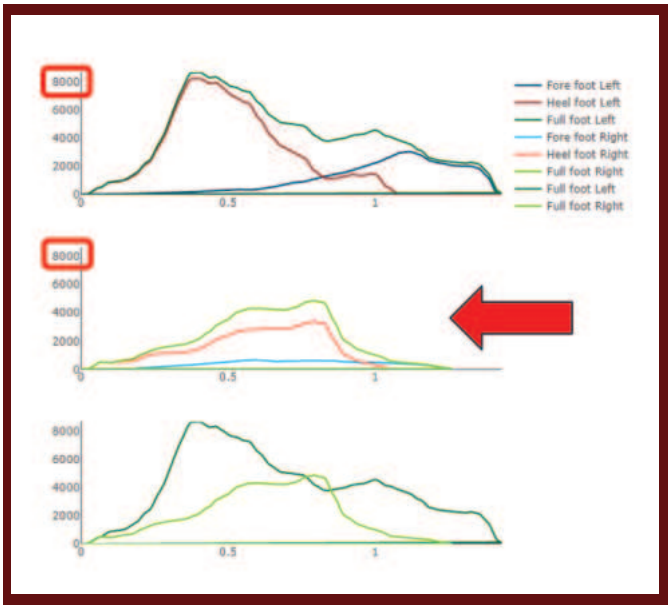


COP Tracking Abnormalities:

- **Left Foot:** Deviation in the midfoot region because of instability of the affected right limb during forefoot offloading and altered toe clearance.
- **Right Foot:** Deviation in hindfoot, indicating ineffective heel strike. Abrupt medial shift in forefoot suggestive of excessive pronation of forefoot during terminal stance.

Pressure Time Curve:

- **Left Foot:**
  1. Uneven heel loading and unloading with prolonged unloading.
  2. Prolonged forefoot loading.
- **Right Foot:**
  1. Non-impactful and inefficient heel and forefoot loading.



KAN INNOVATIONS

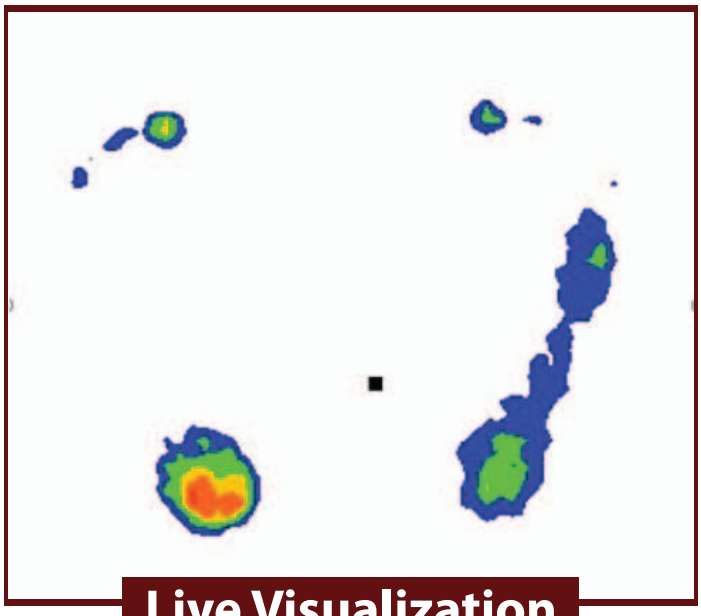
GOALS & INTERVENTIONS

A. Mobility Training: Progression of ROM and flexibility exercises.

B. Weight Distribution Training:

i. Live Visualization: Cues to increase weight distribution on the right side with dynamic feedback.

ii. Shaolin Game: Trains bilateral, anterior and posterior weight shifts on bilateral feet. [3 sets]



Live Visualization

C. Strength Training (Initial Stage)

1. Core and Lower Limb Exercises (2-3 sets with 10-15 reps):

i. Abdominal in-drawing
ii. Quad set
iii. Straight leg raises (SLR)
iv. Side-lying hip abduction
v. Prone leg extension
vi. Prone hamstring curl
vii. Seated heel raises
viii. Toe raises
ix. Arch doming
x. Towel scrunching

2. Progression Using ReGo Gaming Rehabilitation:

Maple Apple Game:

- Encourages proper posture with visual biofeedback reducing compensations.
- Free exercises for the affected lower limb, including hip flexion, extension, and abduction. High knees with abdominal in-drawing (2-3 sets; 15-20 reps).

Additional Resistance: Use ankle weights or theraband.

KAN INNOVATIONS

D. Balance Training with ReGo Gaming Rehabilitation:

- **Shaolin Game:**

- Maintain balance to keep the karma ball centered during controlled movements.
- The dynamic interface and real-time feedback enhance stability, coordination, and key muscle targeting.
- Progress by narrowing the base of support (BOS) with feet together, tandem stance, single-leg stance, and balance board (3-5 sets).

https://drive.google.com/file/d/1Acu9aeURyIM3p_h_-JP6Rf9BJqJKfvYIa/view?usp=drive_link

- **Shapes Game:** Train weight shifts and adjust posture to match specific shapes. This game combines visual and physical stimuli to enhance both motor skills and static balance. (3-5 sets)

https://drive.google.com/file/d/1wbuX-wRLkrp1aZ2v_Vx-GtEEVK8HJYfoot/view?usp=drive_link

Obstacle Training

- **Perturbation Training:** Gradual introduction of external disturbances to improve stability.

E. Gait Training:

- **Live Visualization:** Cues for proper foot placement and effective propulsion.
- **Obstacle Training:** Encourages adequate hip and knee flexion while walking (3-5 rounds).

https://drive.google.com/file/d/1zIcVCl3PBuLbWfFxx-DaTy-5Uo-c2k2tc/view?usp=drive_link

F. Functional Training:

- **Live Visualization:** Trains squatting (ensuring equal weight bearing on both feet with COP position relatively in the center)

https://www.instagram.com/p/C38AolHobti/?utm_source=ig_web_copy_link&igsh=MzRlODBiNWFlZA==

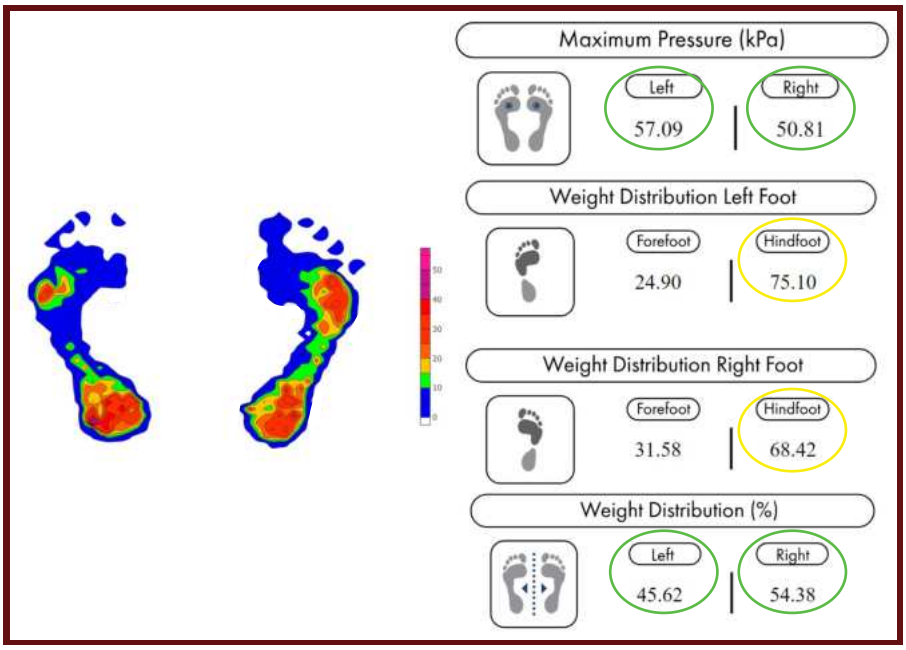
- **Shrinking Island Game:** Focuses on proper form during squat avoiding anterior trunk lean, lifting of forefoot/heel, and excessive pelvic tilt (2-3 sets; 15-20 reps).

KAN INNOVATIONS

WEEK 12

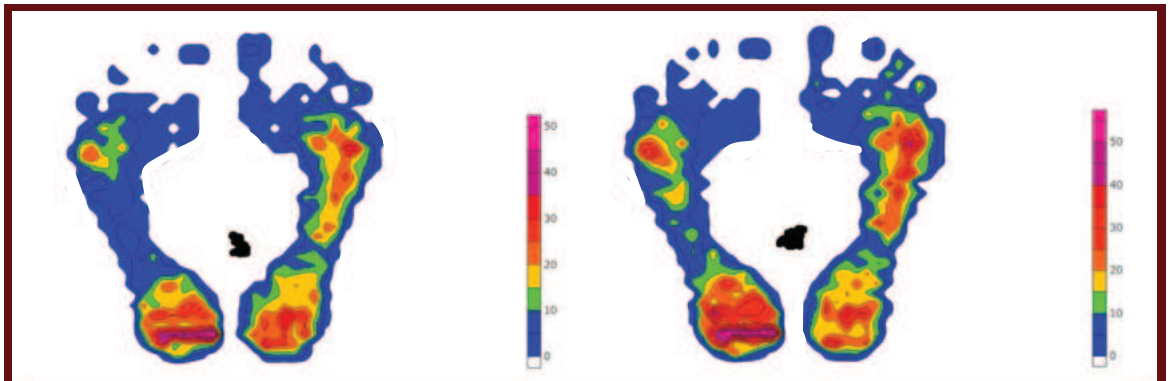
Reduced Pain and Swelling: No pain at rest and 2/10 during activity on NPRS; ankle girth decreased to 22.5 cm.

Improved Weight Bearing: Balanced bilateral weight-bearing with better forefoot and hindfoot weight distribution.



Enhanced ROM and Muscle Strength: Significantly improved range of motion and muscle strength, enabling better performance of activities of daily living (ADLs), with a FADI score increased to 86%.

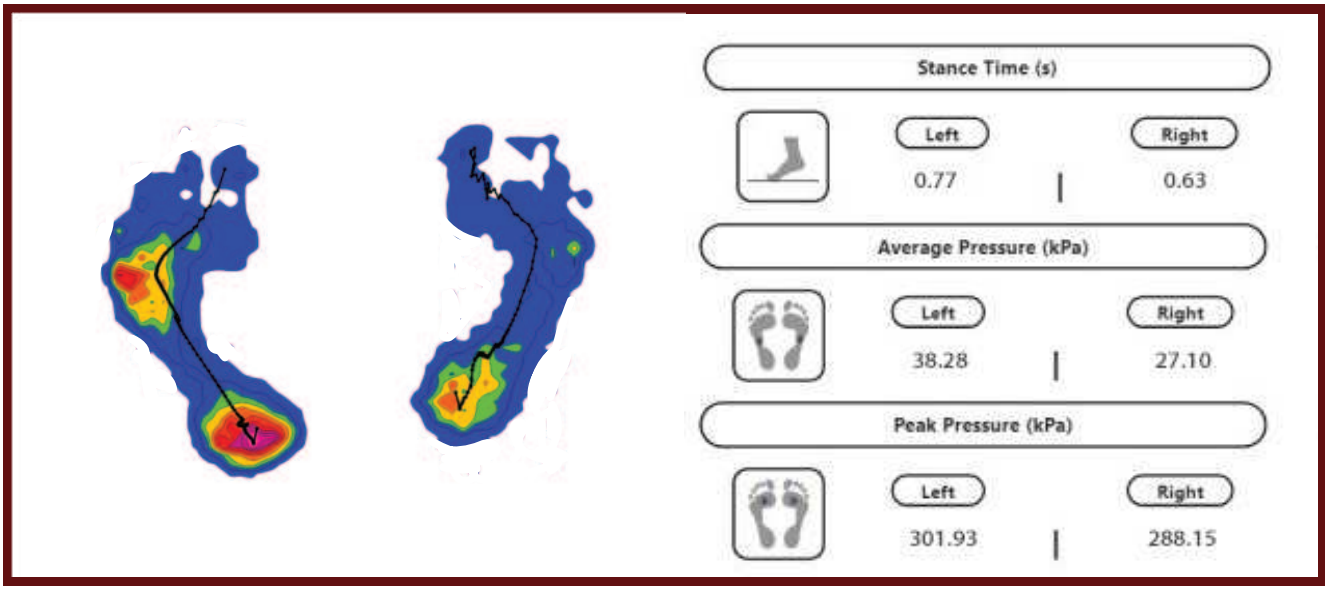
Improved Balance: The center of pressure (COP) moved centrally, indicating better balance.



	Eyes Open			Eyes Closed		
Metrics	Left	Right	Both	Left	Right	Both
Sway Distance (mm)	-	-	713.05	-	-	611.87
Sway Velocity (mm/s)	-	-	36.56	-	-	31.43
Bi-lateral Weight Distribution (%)	44.25	55.75	-	48.74	51.26	-

KAN INNOVATIONS

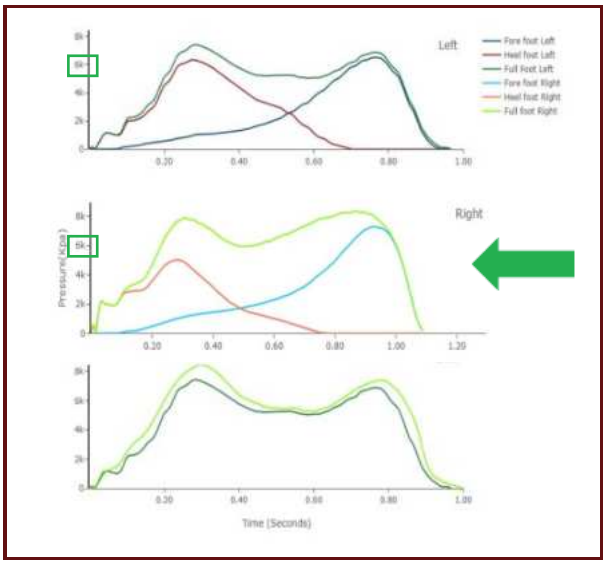
Efficient and Unaided Gait: Achieved an efficient, unaided gait pattern, enabling a successful return to work.



Was able to walk independently

[To see the patient walk independently click on the link:

https://drive.google.com/file/d/1tr-DiG_vS20w2ug-Wo4FFex8z-LeP160UQ/view?usp=sharing



CONCLUSION:

OHM Plantar Pressure System and Gamified Rehabilitation Module ReGo were essential in the recovery of a 50-year-old male with a right talus fracture. Initial assessment revealed impairments in mobility, strength, gait, and weight distribution, with a FADI score of 41%. Using advanced physiotherapy tech includes live visualization and gamified therapy, interventions improved stability, resistance training, and ambulation, raising the FADI score to 86% and enabling a return to work. These tools allowed Dr. Ansuman Das to better understand and effectively treat the patient's condition.