Understanding Your Foot and Ankle

Structure, Function, and Why It Matters for Your Rehab

1 The Foot and Ankle — A Complex Structure

The foot and ankle complex contains 26 bones, 33 joints, and over 100 muscles, tendons, and ligaments — all working together to absorb load, provide propulsion, and adapt to surfaces. It is the only part of the body in direct contact with the ground during walking and running, making it central to the entire kinetic chain from the foot up through the knee, hip, and spine.

Structure	Number	Function
Bones	26	Provide the rigid framework for load-bearing and lever function
Joints	33	Allow complex multi-directional movement and shock absorption
Muscles and tendons	20+ extrinsic and intrinsic	Provide dynamic stability, control motion, and generate propulsion
Ligaments	100+	Passively stabilise joints and guide movement

2 How the Foot Works During Walking

The gait cycle involves a carefully coordinated sequence of phases — each placing different demands on foot structures. Understanding these phases helps explain why certain conditions affect specific tissues, and why your rehabilitation focuses on particular movements and loads.

Gait Phase	What the Foot Does	Key Structures Involved
Heel strike	Foot contacts the ground; begins shock absorption	Heel fat pad, calcaneus, Achilles tendon
Loading response	Foot pronates to absorb impact and adapt to surface	Subtalar joint, tibialis posterior, plantar fascia
Midstance	Foot resupinates; arch stiffens for propulsion	Peroneal muscles, intrinsic foot muscles, plantar fascia
Propulsion (toe-off)	Hallux dorsiflexes; calf complex generates push-off force	1st MTP joint, FHL, gastrocnemius-soleus

3 Foot Posture and Its Effects

Foot posture influences how load is distributed — not just within the foot, but throughout the lower limb and spine. No single posture is inherently 'bad', but certain patterns are associated with increased stress on specific structures, which is why your clinician assesses posture as part of your overall management.

Foot Posture	Common Associated Loading Pattern	Potential Areas of Increased Stress
Excess pronation (flat foot)	Medial loading; valgus stress at knee	Plantar fascia, tibialis posterior, medial knee
Excess supination (high arch)	Lateral loading; reduced shock absorption	Peroneal tendons, lateral ankle, ITB
Hallux valgus (bunion)	Reduced push-off from 1st ray; lateral toe overload	Lesser metatarsals, lesser toes, hip abductors
Rigid/cavus foot	Poor shock absorption; increased stress fracture risk	Metatarsals, lateral ankle, Achilles

4 How Orthotics Interact with Foot Function

Custom foot orthotics work by modifying the interface between the foot and the ground — changing pressure distribution, motion control, and sensory feedback. Each feature of an orthotic is designed with a specific biomechanical goal. Understanding what your orthotic does can help you use it more effectively and communicate with your clinician.

Orthotic Feature	What It Does	Why It Matters
Medial arch support	Supports the arch; reduces pronation	Offloads plantar fascia and tibialis posterior
Heel cup	Controls rearfoot motion; cushions heel strike	Reduces Achilles load; improves rearfoot alignment
Metatarsal pad	Redistributes pressure away from metatarsal heads	Reduces forefoot pain in metatarsalgia and Morton's neuroma
Top cover material	Affects cushioning and friction at skin interface	Protects vulnerable skin; manages shear forces
Intrinsic posting	Built-in wedge modifies foot position from within the device	Fine-tunes alignment for specific conditions

5 Key Takeaways

KEY TAKEAWAY 1

Your foot is a dynamic, intelligent structure — not just a platform. With 26 bones, 33 joints, and over 100 soft-tissue structures, the foot is one of the most complex mechanical systems in the body. Every step involves a finely tuned sequence of loading, adaptation, and propulsion. Respecting this complexity — through targeted rehabilitation, appropriate footwear, and well-designed orthotics — is the foundation of lasting recovery.

KEY TAKEAWAY 2

Posture and function are connected — but posture alone does not predict pain. Flat feet, high arches, and bunions are associated with particular loading patterns, but they do not inevitably cause pain. What matters is how your tissues are managing the load placed on them. Your clinician's assessment considers posture as one piece of a broader picture that includes strength, flexibility, footwear, and activity levels.

KEY TAKEAWAY 3

Your orthotics are a tool — not a permanent solution in isolation. Orthotics modify load distribution and provide support, but they work best as part of a comprehensive plan that includes exercise, activity modification, and education. As your strength and function improve, your orthotic needs may change. Revisit your orthotic prescription with your clinician as your rehabilitation progresses.