Structural Hallux Rigidus: Pathophysiology and Treatment.

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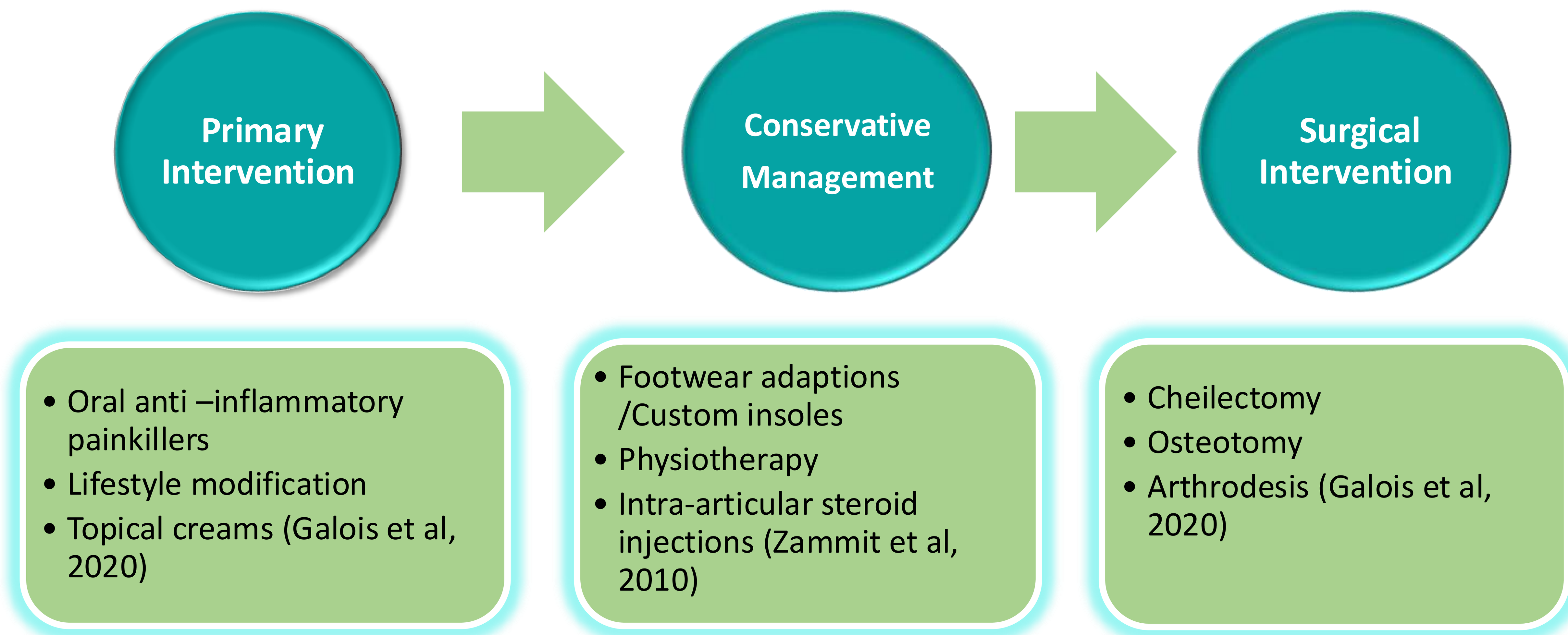
INTRODUCTION

Structural Hallux Rigidus is a condition defined by pain and restriction of motion of the first metarsophalangeal joint (MTPJ). It occurs most commonly as a secondary condition to hallux limitus (de la Rosa and Viladot-Pericé, 2021) and affects 2.5% of people over the age of 50 (Colò et al, 2020).

The aetiology of the disease is unidentified, however, there are numerous contributing factors, e.g. trauma, osteochondral lesions and inflammatory arthropathies (Galois et al, 2020).

Symptoms will progressively worsen and have an impact on a person's gait (Castro-Méndez et al, 2023). There are three main categories of treatment: Primary intervention, conservative management and surgical intervention. These aim to improve function and quality of life .

MEDICAL INTERVENTIONS



THE EFFECTS OF HALLUX RIGIDUS ON GAIT

Patients with hallux rigidus (HR) tend to alter their gait pattern to reduce pain and compensate for the limited range of motion at the first MTPJ potentially affecting balance and gait. HR does not affect the swing phase of the gait cycle however does impact the mid to end stance phase, and particularly the 3rd rocker of gait by losing propulsion through the 1st MTPJ. Normal first MTPJ range of motion is around 110 degrees with a plantar flexion of 35 and dorsiflexion of 75 (Galois et al, 2020) however with HR range of motion (ROM) is reduced to 0-15 degrees. HR can have a notable impact on sagittal plane hallux motion, leading to an increase in supination in the forefoot during push-off to compensate. Another study from journal of orthopaedics and sports therapy suggest Some experts think that when the foot pronates, the first metatarsal gets pushed up, limiting movement in the proximal phalanx on the first metatarsal head and leading to problems (Zammit et al, 2010).
Others believe that limited movement in first metatarsal is forced into dorsiflexion this changes the individuals angle of gait to compensate. A study found that even though people with hallux limitus/rigidus walked at a different angle, their foot posture measurements were no different than those without the condition. This suggests that hallux limitus/rigidus isn't linked to having a pronated foot posture however x-rays used in these studies show different results (Lam et al, 2017).

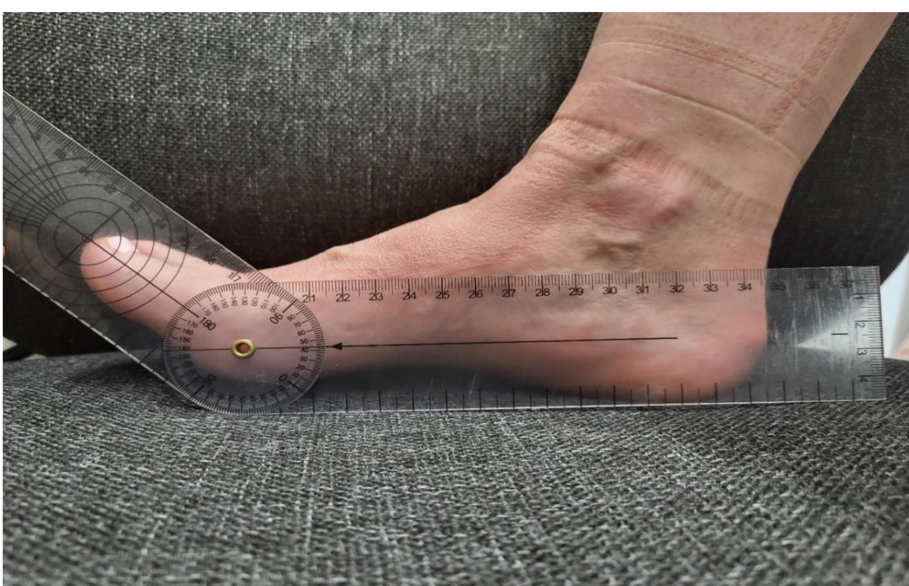
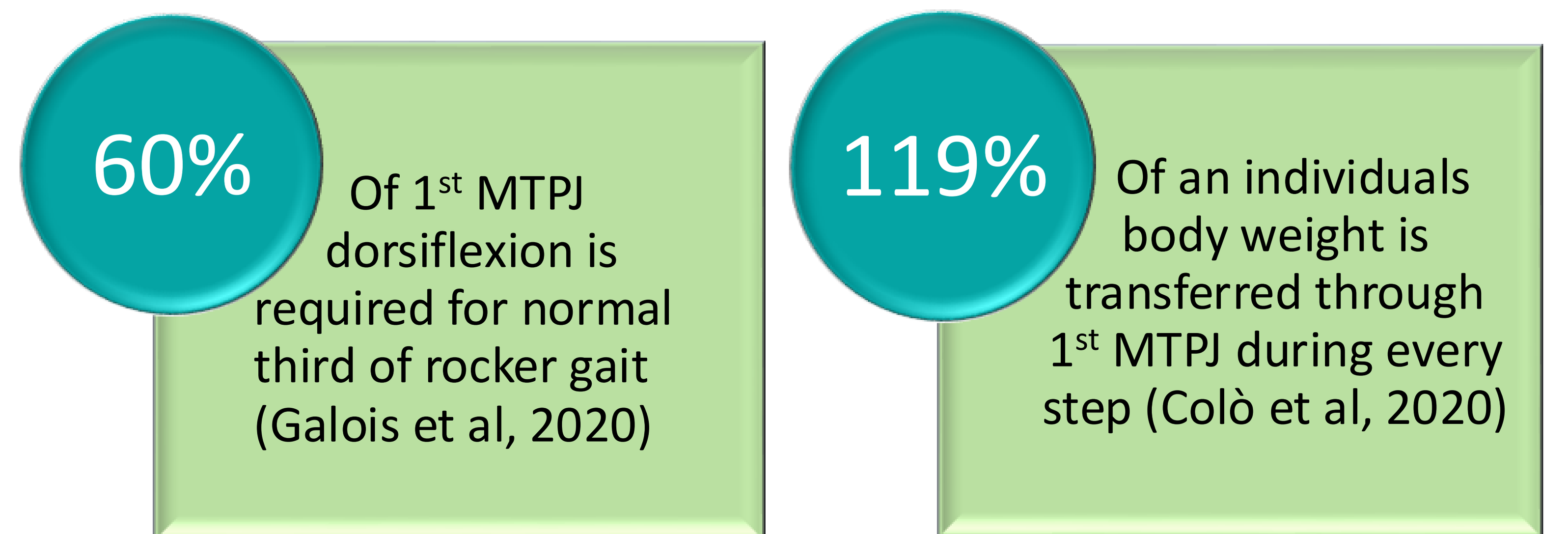


Image to show the measurement of 1st MTPJ dorsiflexion using a goniometer.



HALLUX RIGIDUS JOINT PRESERVATION

Due to the progressive nature of this condition, it can have an increasing impact on patient quality of life. Patients may have difficulty donning shoes due to bone spurs developing, altered gait/biomechanics which can result in knee, hip or back pain. This is due to the arthritic changes and deterioration of the 1st MTPJ, as originally reported by Davies Colley (Zammit et al, 2010). Below is the "gold standard" four grade classification system for 1st MTPJ range of motion by Coughlin and Shurnas (Zammit et al, 2010):

Grade 0 - 40-60 dorsiflexion normal
Grade 1 - 30-40 dorsiflexion minimal joint changes
Grade 2 - 10-30 dorsiflexion moderate joint narrowing or sclerosis, osteophytes
Grade 3 - less than 10 dorsiflexion severe x-ray changes
Grade 4 - stiff joint severe changes with loose bodies and osteochondritis

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RESULTS AND METHODOLOGY

I conducted my research by reading numerus journals and exploring different medical studies to gain a deeper understanding of HR. By educating myself, this will improve my daily clinical practice by understanding the condition and how it will affect my patients. This condition affects gait, movement, participating in physical activities and even daily tasks. There are several medical interventions that will slow the progression and complete loss of function in the joint. Now that I have more knowledge I will encourage my patients to strengthen the intrinsic muscles of their feet to facilitate foot function, and I will be better placed to help my patients understand how conservative management, including foot orthoses, can help with the symptoms associated with their condition. Although HR real cause has not been studied in detail it is believed to be the second most common issue with the big toe after hallux valgus (bunion) (Zammit et al, 2009). There has been a number of studies conducted to lower symptoms. On the other hand a study conducted from Cochrane review shows that conservative interventions are not shown to be any more superior than primary and surgical interventions to help pain and function however this view is subjective as the paper states poor quality trials (Zammit et al, 2010).

Thank you to Glasgow Caledonian University Team for their support, in particular Douglas Lachlan as my team facilitator, Laura Barr and Maeve Cassidy my NHS mentor.